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EST. 1902

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PUBLIC LI
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* Refined Cylinder and Malleable Pig Iron

* Special Alloy Pig Iron and Hi Carb Iron

* Sole manufacturers of AUTOMAT (Regd.) Pig Iron

Refined Iron Co. (Darwen) Ltd.

THERE ARE STILL MORE ROTO-CLONES* IN SERVICE THAN ANY OTHER WET-TYPE DUST COLLECTOR

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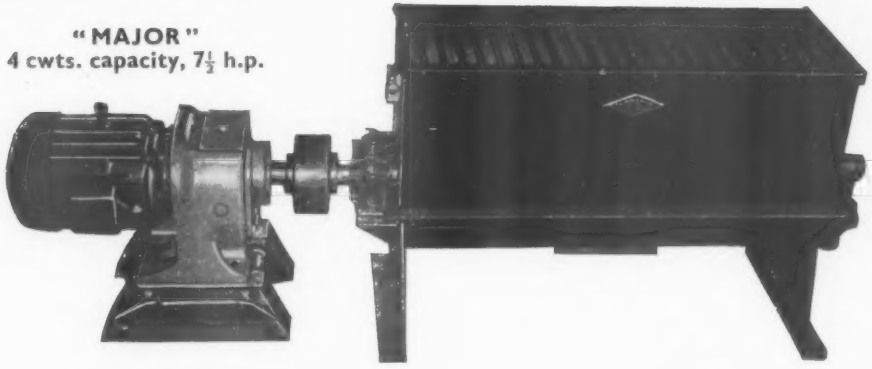
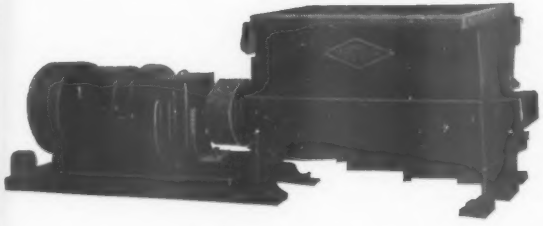
SAND MIXING MACHINES

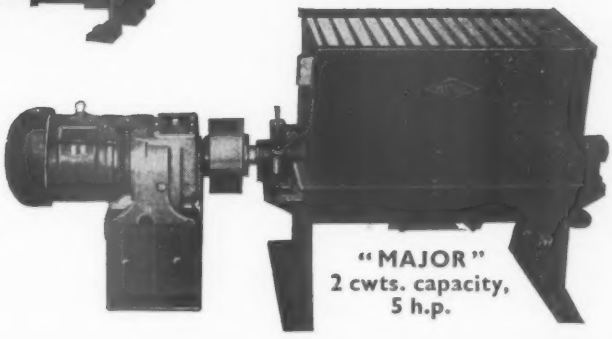
"MAJOR"
4 cwts. capacity, 7½ h.p.





"MINOR"
50 lbs. capacity, 1 h.p.

- ★ *Rapid intensive mixing.*
- ★ *Fixed safety locking device.*
- ★ *Also supplied with belt drive.*
- ★ *Any voltage supplied.*
- ★ *Mixing time, 2-4 minutes each batch.*
- ★ *Low upkeep costs.*



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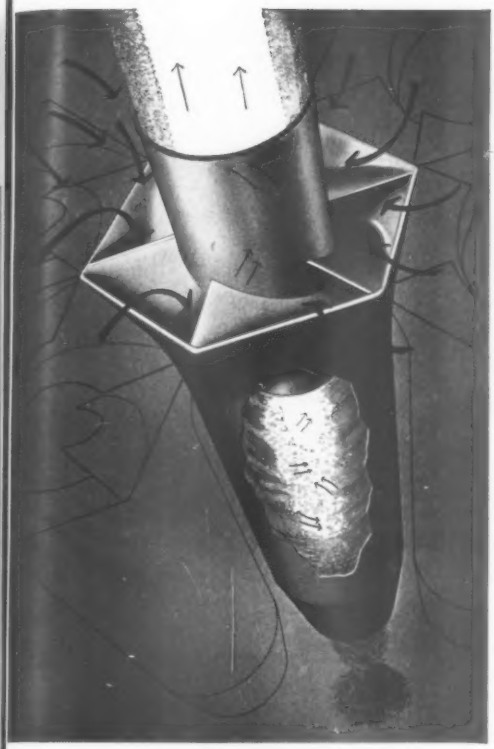

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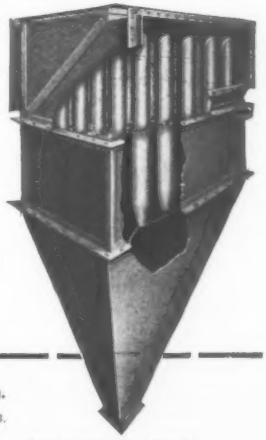
P PARTICLE
A ACCELERATION



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The **BLO SHOOTER** will blow or shoot cores and moulds using any sand which can be rammed by hand.

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Pig Iron

BRADLEYS BASIC REFINED is produced by a newly developed process utilising basic lined furnaces and operating with a wholly basic slag.

BASIC REFINED IRON is specially suitable for Nodular or Spheroidal Graphite Iron, Roll Making, Steel Making, Carburising Iron and all processes requiring an exceptionally pure cast iron.

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- SULPHUR contents in "B.B.R." normally range between 0·004% and 0·02%. Specially low sulphurs determined within the limits of accuracy of B.S.I. Method (Specification No. 1121, Part I, 1943) can be guaranteed.
- PHOSPHORUS contents of "B.B.R." normally range from 0·04% to 0·50% according to requirements. Specifications of less than 0·04% can be met under certain circumstances.
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- RESIDUAL ELEMENTS. Control is exercised over the whole range of residual metallic elements through our Spectrographic Laboratories and Certificates of Analysis can be supplied with every consignment.

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DARLASTON · STAFFORDSHIRE

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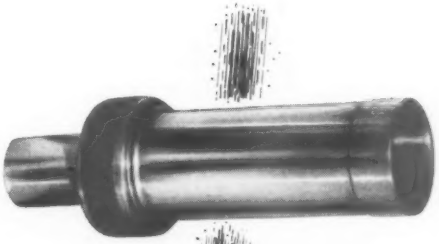
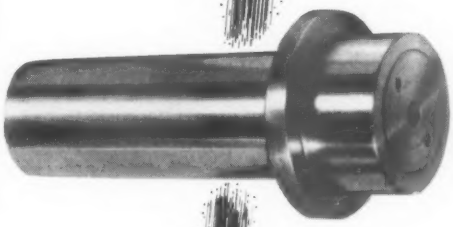
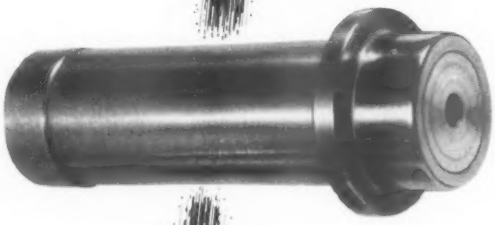


Perfection!



UNIBLAST



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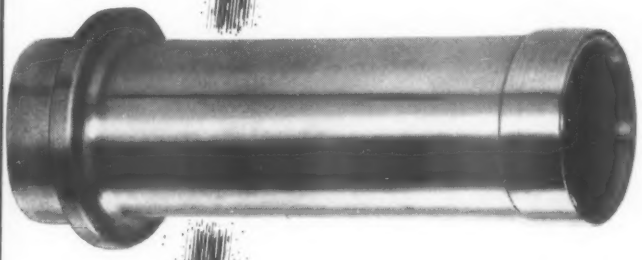

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The fastest method of cleaning castings!

AT
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MAIDSTONE

These pictures show that Tilling Stevens Ltd., of Maidstone know the most up-to-date and efficient method of removing sand and scale from castings. The components are cast iron suspension unit brackets for armoured fighting vehicles, and are blasted continuously on the rotary table in a 4 minute time cycle. The model shown is WMT4, just one of an extensive range which sets the highest standards yet known in abrasive cleaning. There are Wheelabrator Shot Blast Machines in types and sizes to suit all general applications, in addition to which much special plant has been designed to meet specific requirements.

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ROTARY TABLE — AIRLESS

WHEELABRATOR

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Lightweight Saffire has many advantages

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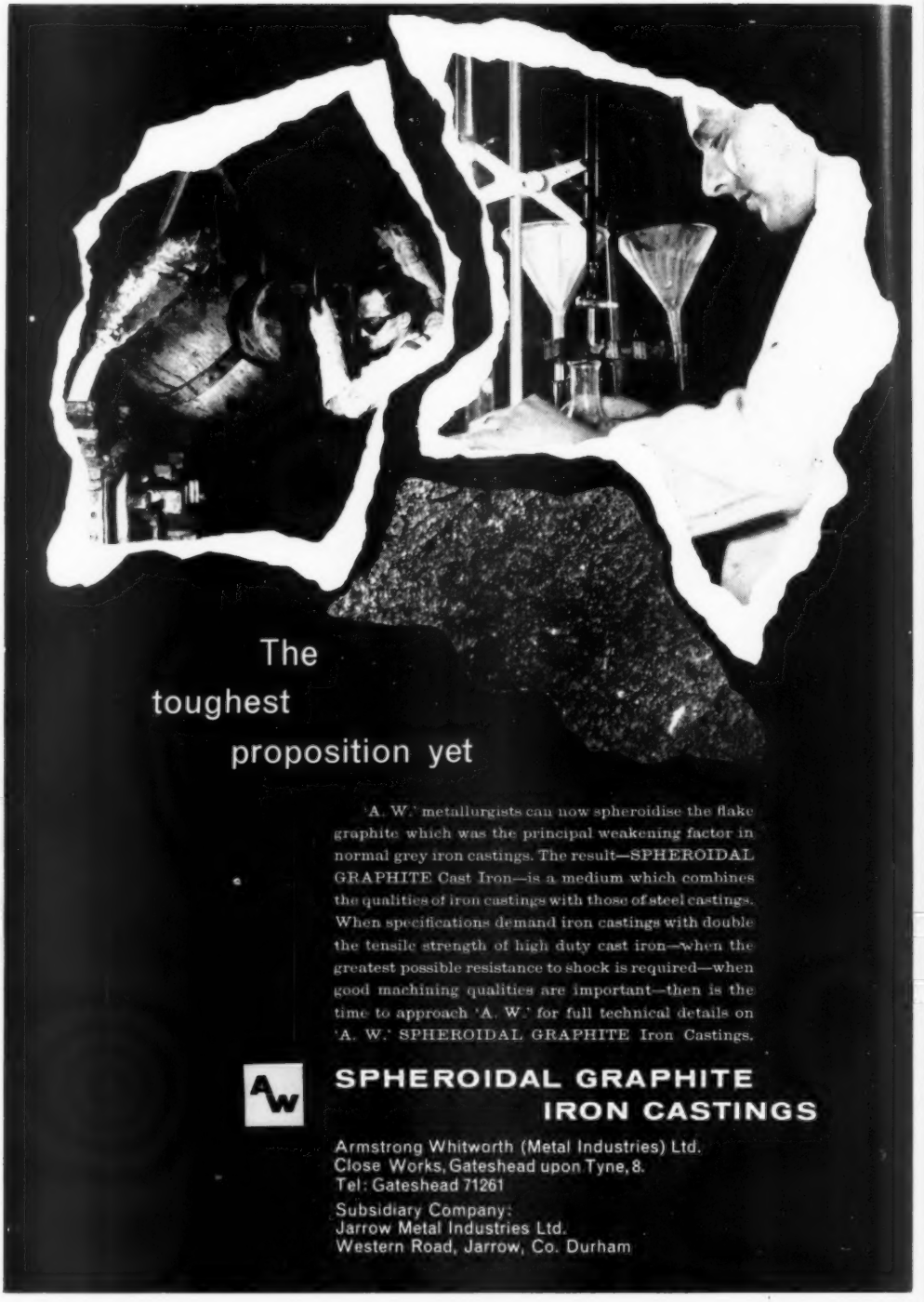
A1


The
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'A. W.' metallurgists can now spheroidise the flake graphite which was the principal weakening factor in normal grey iron castings. The result—SPHEROIDAL GRAPHITE Cast Iron—is a medium which combines the qualities of iron castings with those of steel castings. When specifications demand iron castings with double the tensile strength of high duty cast iron—when the greatest possible resistance to shock is required—when good machining qualities are important—then is the time to approach 'A. W.' for full technical details on 'A. W.' SPHEROIDAL GRAPHITE Iron Castings.
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960

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service to keep
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FOUNDRY PLANT & MACHINERY LTD
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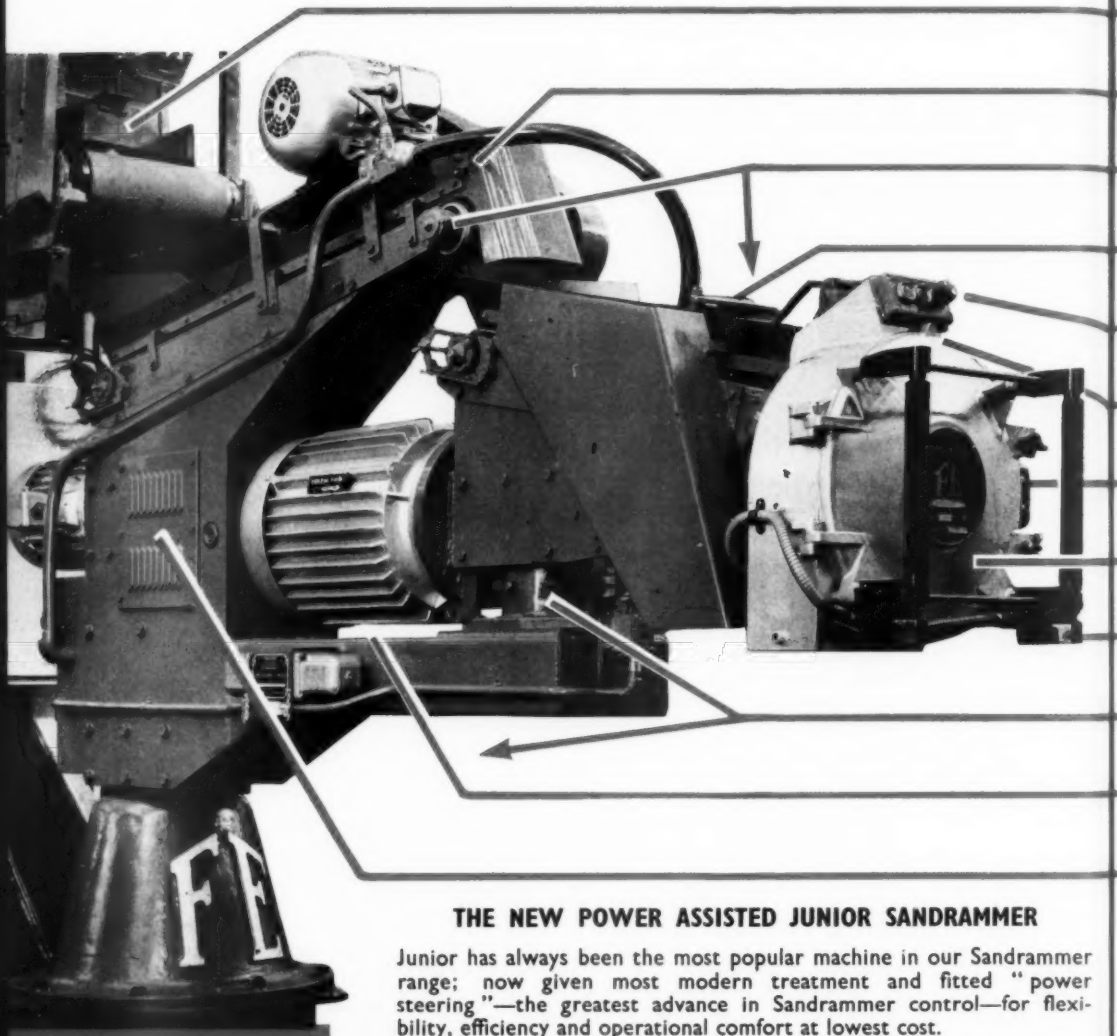

THE NEW POWER ASSISTED JUNIOR SANDRAMMER

Junior has always been the most popular machine in our Sandrammer range; now given most modern treatment and fitted "power steering"—the greatest advance in Sandrammer control—for flexibility, efficiency and operational comfort at lowest cost.

All Sandrammers now available with Power Assisted Arms as optional refinement (Major fitted pneumatic powered single reciprocating arm as standard feature). 1959 introductions also feature bigger, more powerful Sandrammers up to 24in. Head and 15ft. arm radius.
Design ruggedness thrusts itself at you—powerful appearance, powerful performance!

SEND FOR BRAND NEW LEAFLET 150

POWER ASSISTED !

Pneumatic gate on feed hopper and belt for continuous regulated sand delivery.

Permanent magnet—quick release fixing for rapid cleaning.

All belts driven at head drum—no belt whip, no spillage.

By-pass plough and chute with handy Head control for unrammed sand delivery.

Push button electrical panel for interlocked sequence control.

Micro-safety switch for positive "cut-out" when Head open.

Push-button pneumatic panel for feed hopper gate control.

18in. diameter Head containing World Patented, Twin, Curved Bladed Impellor (adjustable for wear).

"POWER STEERING" HANDLES—EFFORTLESS CONTROLLED ARM SWING.

Independent hydraulic "Slave Units" for torque control of arm pivots.

Accessible dial adjustors controlling arm travel speed.

Ventilated enclosed hydraulic pump unit (1,000 p.s.i.) with independent motor, operating "Slave Units".

F. E. Sandrammers are covered by British Patent No's: 570641, 663318, 657197, 714063, 714064, 714065 and 742745. Patents granted or pending in other industrial countries throughout the world.

PLEASE VISIT US AND SEE THESE NEW SANDRAMMERS OPERATING IN OUR FOUNDRY.

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FOR FOUNDRY EFFICIENCY
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FOUNDRY EQUIPMENT LTD

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RISEREX and RISERITE

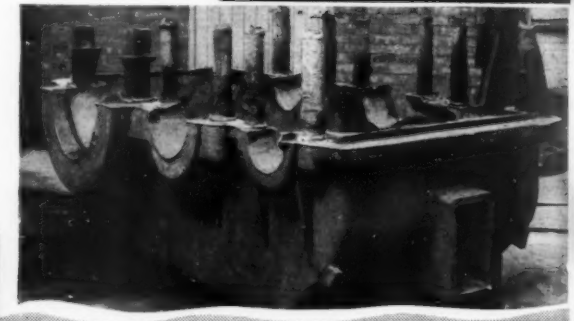
Exothermic Feeding Compounds

RISEREX is a mouldable exothermic compound for the production of feeding sleeves and mould inserts, providing additional local heat and promoting casting soundness. Applied as a riser sleeve it also ensures economy resulting from a higher casting yield.

Exothermic feeding of a Half Gear Casing 4½ tons as cast.

- The mould in the floor before coring up.
- Some of the 12 exothermic sleeves in action.
- The casting showing the 12 exothermic sleeved risers, the use of which produced a high grade sound casting. Made by THE DUDLEY FOUNDRY LTD. and illustrated by their kind permission.

RISERITE hot topping compound provides additional heat and forms an insulating cover or blanket which prevents heat dissipation.



HARMARK
FOUNDRY SUPPLIES

MARKET HARBOROUGH-LEICESTERSHIRE PHONE 2254 · 5 · 6 GRAMS HARMARK - M'HARBORO

120 moulds per hour all of consistent quality

Compared with the normal hand-operated machine this *electronically* controlled moulding machine has distinct advantages. Each operation of the moulding cycle is performed in the exact, predetermined, optimum time, thus ensuring that all moulds are exact replicas of each other. This leads to a uniform, consistent quality of casting with a minimum of scrap. A considerably increased output rate is also ensured, 120 moulds per hour being well within the capacity of an effectively tended unit. *The quickly set controls make the ELECTRAMOLD equally suitable for long and short runs.*

Write for brochure giving full technical data.

COLEMAN-WALLWORK FOUNDRY EQUIPMENT DIVISION

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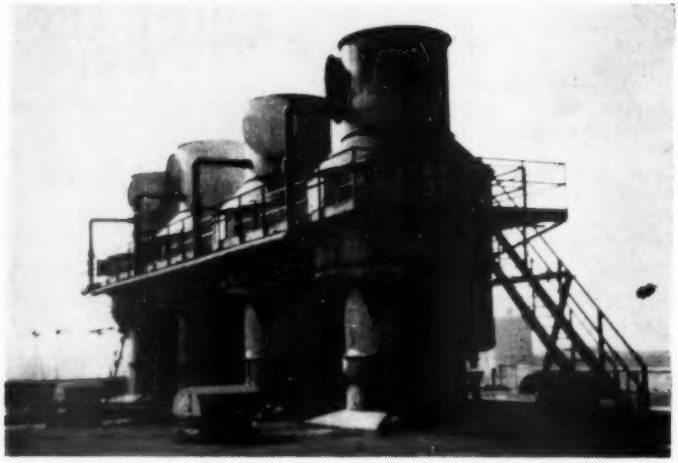
Stone Group

The 'CLEAN AIR ACT' demands EFFICIENT sudtand grit suppression

Instal... TITAN WET ARRESTERS

Designed by the principal Cupola manufacturers in the U.K. with more than 40 years experience and proven practice in all aspects of Cupola operation.



Many Foundrymen think Wet Spark Arresters are a recent development and because of troubles experienced with some installations, usually caused through bad design, they tend to regard them with suspicion.

We are proud that FORD MOTOR CO. selected **TITAN** Wet Spark Arresters for the **4 TITAN** 30 ton per hour Hot Blast Cupolas which we installed in their new Thames Foundry, the most modern in Europe.

These are illustrated, the second Cupola from the left is "blowing" —note the complete absence of dark smoke, sure proof of efficiency.

Photo completely untouched taken during normal operating conditions.

CONSIDER THESE ADVANTAGES

- **Reduce Maintenance or Replacement of Gutters, Drains and Roof Sheeting.**
- **Protection of Paintwork, Roof Structures and Coatings, Glazing, etc.**
- **Eliminate Fire Hazards. It's worth approaching your Insurance Company!**
- **Improve Working Conditions in Adjacent Workshops, Enamelling Plants, Offices.**

THE CONSTRUCTIONAL ENGINEERING CO. LTD

DESIGNERS & ACTUAL BUILDERS OF EFFICIENT FOUNDRY PLANT

TELEGRAMS STRUCTURAL

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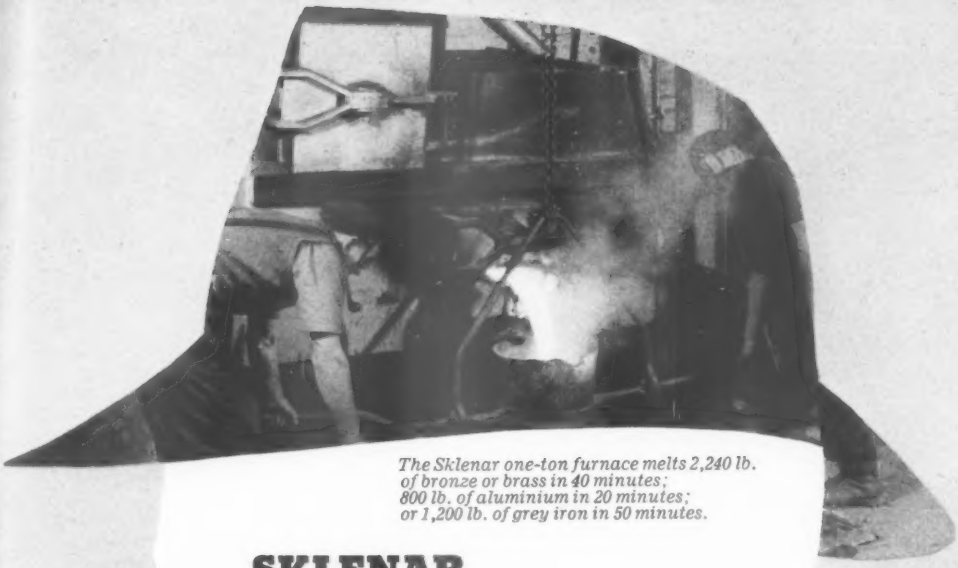
Send for brochure No. 213 TO-DAY

for SKLENAR—the casting vote!



The Sklenar one-ton furnace melts 2,240 lb. of bronze or brass in 40 minutes; 800 lb. of aluminium in 20 minutes; or 1,200 lb. of grey iron in 50 minutes.

SKLENAR

furnaces for general duties in the foundry.

VERSATILITY...

SKLENAR furnaces melt light alloys, brasses, bronzes, and grey iron in sequence with no risk of contamination.

EFFICIENCY...

SKLENAR furnaces give quick melts (500 lb. brass in 35 minutes) with low metal losses (maximum under 2 per cent.). Finger-tip control of atmosphere for melting non-ferrous metals is standard.

ECONOMY...

SKLENAR oil or gas fired furnaces save fuel (0.08 gallon of fuel oil or 4 cubic feet of gas per lb. of metal are typical). No crucibles to renew—no spares to worry about.

FULL TECHNICAL AND OPERATIONAL PARTICULARS AVAILABLE FROM

SKLENAR
FURNACES LIMITED

* *14 days' Free Trial in Great Britain*

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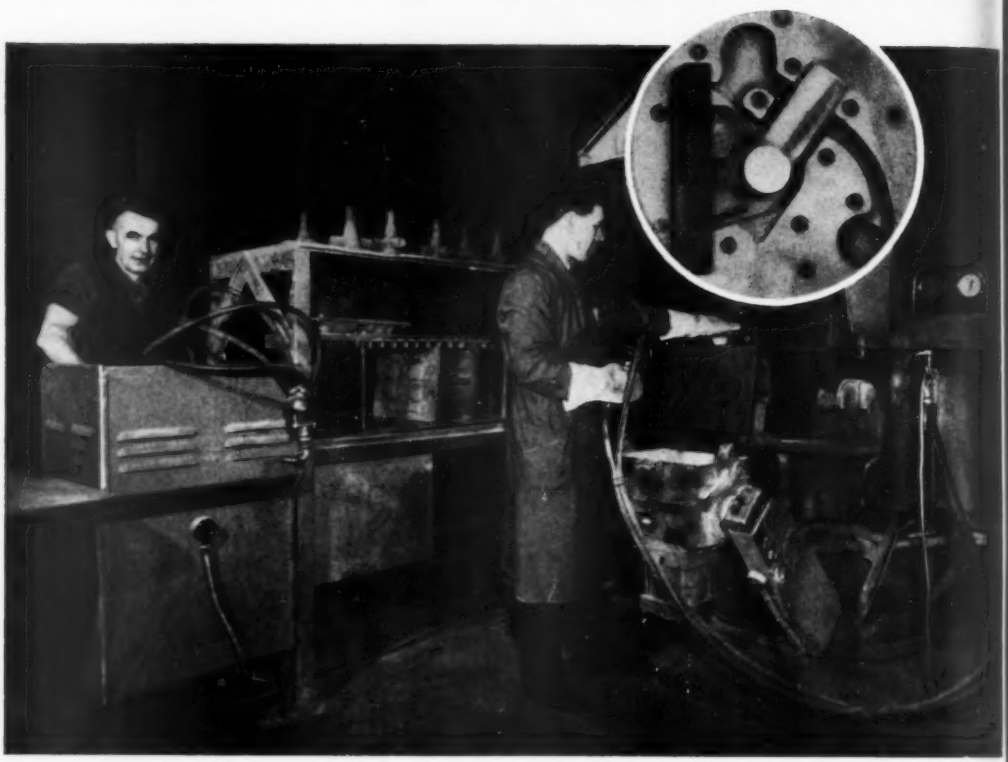
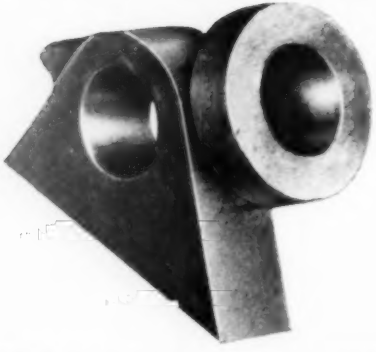
TELEPHONE: CARDIFF 45645 (Private Exchange)
GRAMS: SKLENAR CARDIFF 45645

BETTER MELTING WITHOUT CRUCIBLES

Another Polygram Installation at A.P.V.-Paramount Limited



Photograph of a section of the POLYGRAM Shell Moulding equipment installed at A.P.V.-Paramount Ltd., Crawley, Sussex.



One of the Shell Moulded stainless steel castings incorporated in the manufacture of a Heat Exchanger. Photographs by Courtesy of A.P.V.-Paramount Ltd.

A.P.V.-Paramount Ltd. obtain substantial cost reductions and machining economies Shell Moulding a wide range of stainless steel components for the Chemical, Brewery and Allied Industries.

Any information you may require concerning the world-famous range of precision built POLYGRAM Shell Moulding Machines and Equipment as supplied to principal foundries in Britain and the Commonwealth, The Ministry of Supply and the Crown Agents for oversea Governments and Administrations will be forwarded on request.

Polygram Casting Company have a competent and complete service to offer and your enquiries are invited.

Polygram

THE FIRST NAME IN SHELL MOULDING

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"MORE CORN FROM FINSBURY SQUARE?"

"Now, now . . . a little more respect from you, my lad– that was one of the old masters of our early advertising (Hassell *circa* 1912). And what's more we're still passing each new winning post with Sternol Oils."

STERNOL

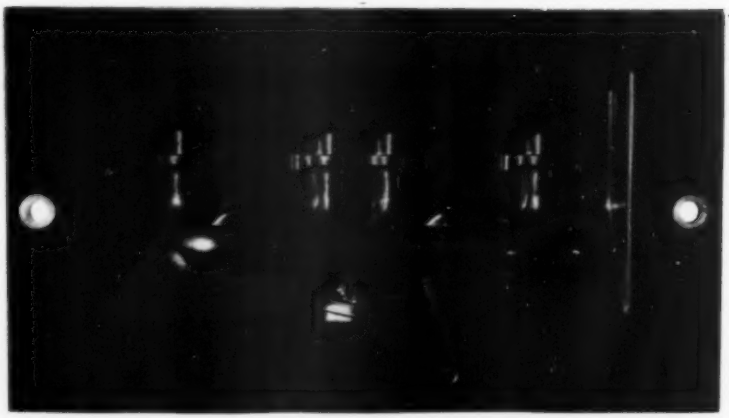
Sternol quality oils cut costs

STERNOL LTD. ROYAL LONDON HOUSE, FINSBURY SQUARE, LONDON E.C.2. Tel: MONarch 3371-5

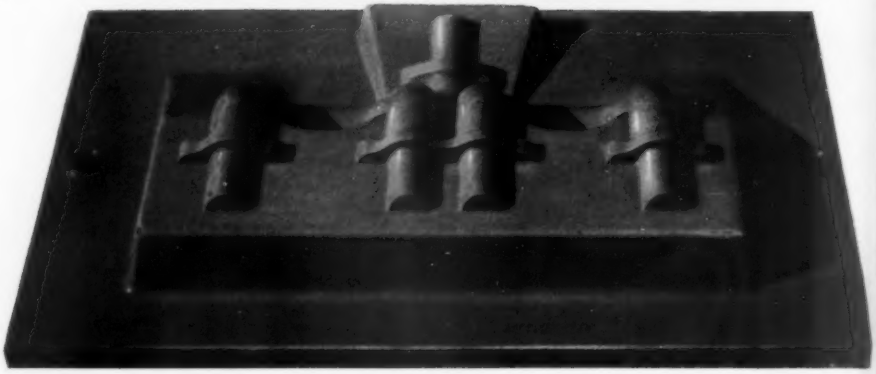
MANIFOLD ADVANTAGES

These single sided foundry patterns for induction manifolds for car engines are replicas of master patterns and are cast in Araldite Casting Resin F. This remarkable epoxy resin does not shrink on setting, and therefore gives duplicates of extreme accuracy, both in dimensions and detail, and with excellent surface finish. Araldite is very tough and durable, so that patterns are not easily damaged. It resists chemical action, has no grain structure, and patterns of filled resin may be used with the CO_2 process. Patterns cast in Araldite do not deteriorate whilst in store, and require little attention.

May we send you further particulars?



Foundry patterns cast in Araldite by H. J. Dowler (Engineers' Pattern Makers) Ltd., Birmingham



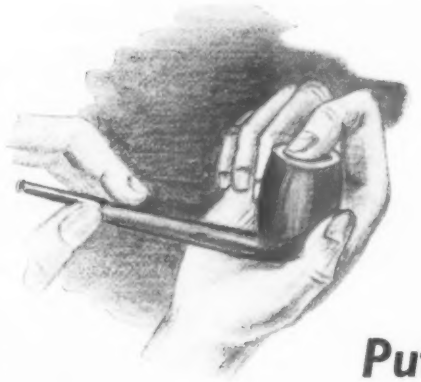
Araldite epoxy resins

Araldite is a registered trade name

CIBA (A.R.L.) LIMITED *Duxford, Cambridge. Telephone: Sawston 2121*

AD 523

Ask Berk for BERKOAL



BERK CHEMICALS

Put this in your pipe!

—and smoke it if you like, but a more rewarding experience would be to add Berkoal to your moulding sand.

BERKOAL is a fine fibrous organic powder designed as the antidote for expansion defects such as scabs, buckles, rat tails, etc. 2% or 3% Berkoal milled into natural semi-synthetic, or synthetic sand will give these advantages :—

1 **Increases green strength.**
2 **Reduces coal dust required.**
3 **Keeps sand in good mouldable condition.**
4 **Reduces costs.**
5 **STOPS SCABBING.**

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To :—F. W. BERK & Co., Ltd.,
Berk House, P.O. BOX 500,
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Please send me—

☐ Free sample of.....lbs. Berkoal.

☐ Quotation for BERKOAL and literature

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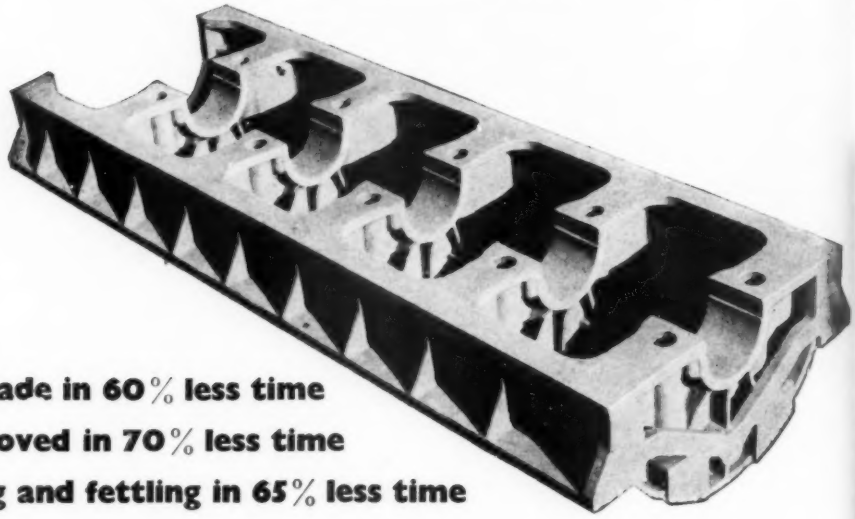
AD 522

DIE CASTING? (!)
No, just the usual COROVIT finish on a 3 ton BEDPLATE!



Cores made in 60% less time
Cores stoved in 70% less time
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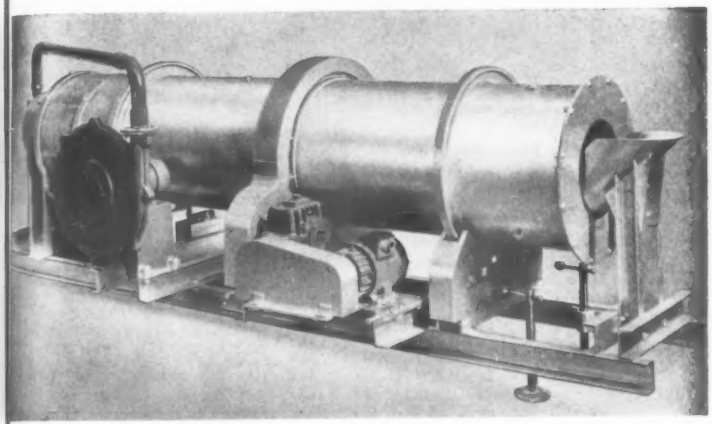

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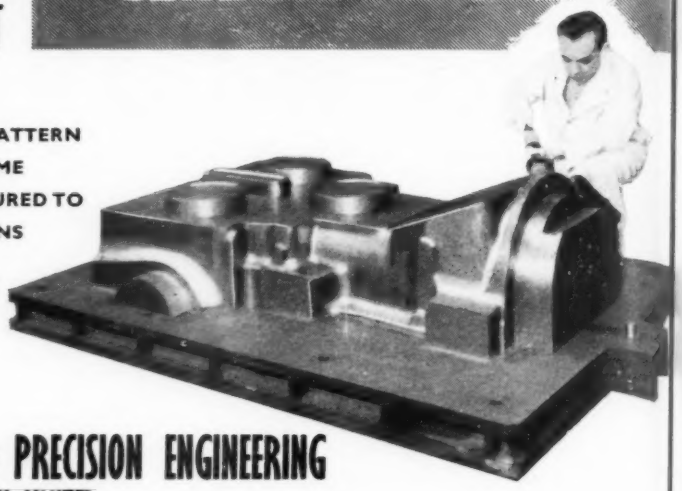

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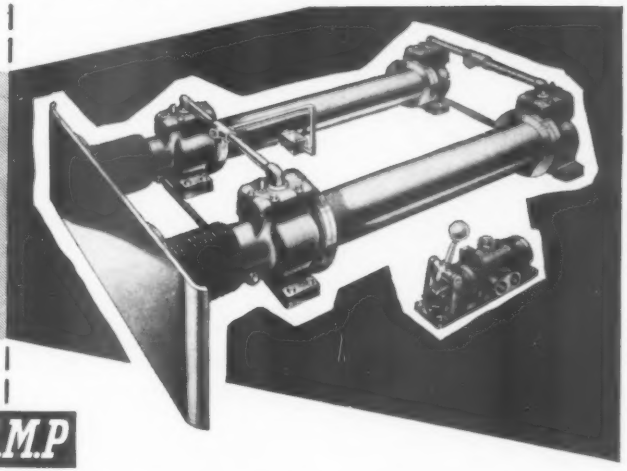

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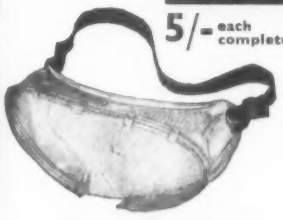

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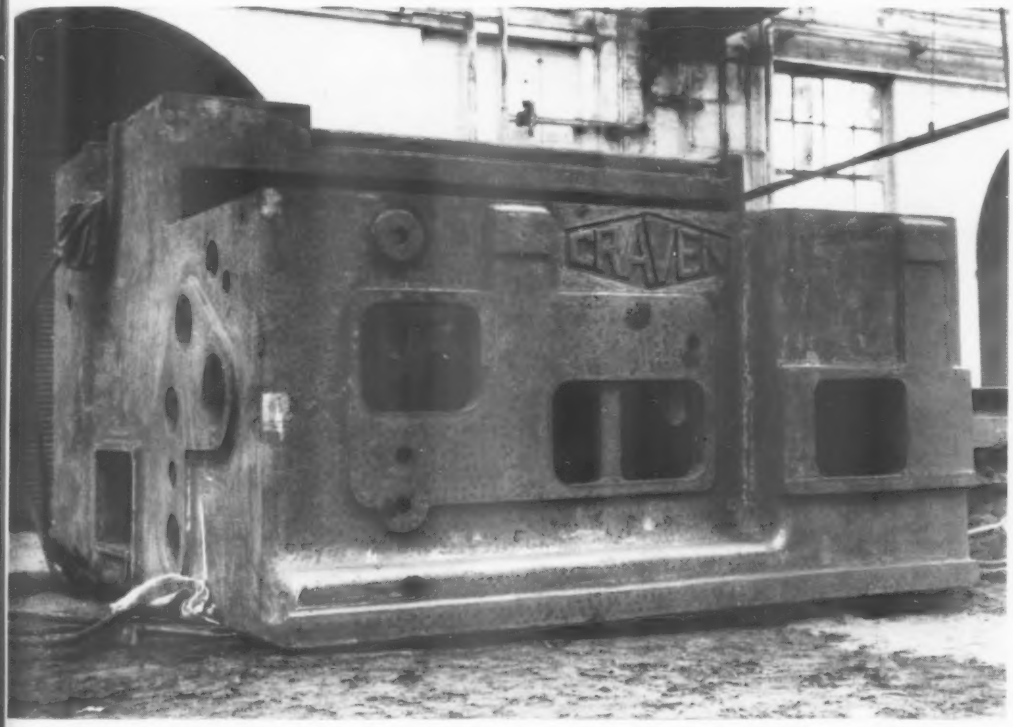

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FOUNDRY TRADE JOURNAL

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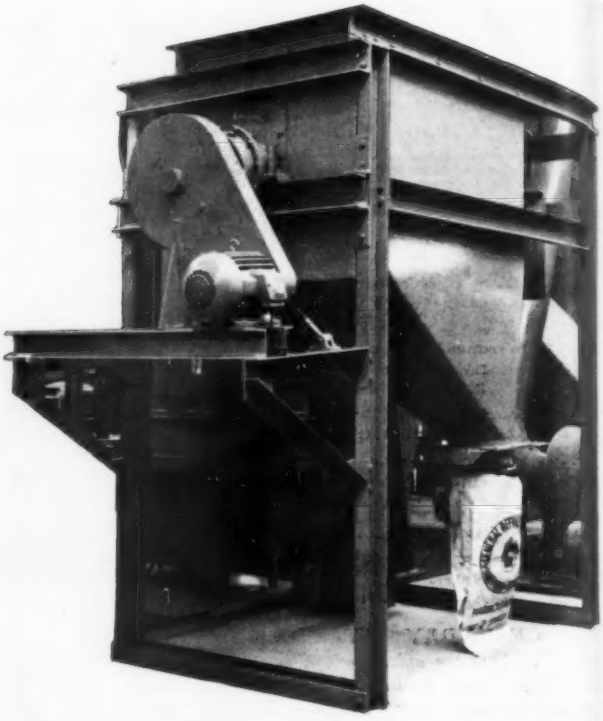

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FOUNDRY
TRADE JOURNAL

Vol. 108 FEBRUARY 4, 1960 No. 2252

European Free Trade Association

This booklet, entitled "European Free Trade Association,"* unlike most previous publications, makes it crystal-clear that there is a fundamental difference between the "inner six" countries (France, Germany, Italy and Benelux countries) and the "outer seven" (United Kingdom, Sweden, Denmark, Norway, Austria, Switzerland, and Portugal). The former are organized under a Customs Union, whilst the latter are concerned with the creation of a European Free Trade Area. This means that the inner six in imposing import duties on goods from countries outside their organization make them applicable to the whole group, whereas among the outer seven, each participant is free to treat with non-member countries as policy and economics dictate. This was the cause of the splitting of Europe into two economic groups, as the outer seven deemed the setting-up of a customs union to be detrimental to their trading potentialities.

The outer seven (EFTA) have a population of 70 millions, which is small compared with the 290 millions of the envisaged European Association, but the average standard of living of the former group is higher than the inner six, and they import much more than the seven—nearly £1,000 millions in 1958. The Stockholm Convention, which governs the outer seven, has been welcomed by the majority of the members of the Federation of British Industries, with some reservations by the paper industry. The fear that there are possibilities of circumventing the conditions attached to the agreement is virtually groundless, as most of such cases have been provided for. Suppose, for example, one country has a high duty on imported alloy, whilst another has a low duty, the importing by the second country for re-export to the first is taken care of. So, too, are a number of other devices, such as hidden subsidies and the like. These matters are all well set out in the booklet, which is invaluable alike to the manufacturer and merchant.

Exports of the UK foundry industry are very much tied up with those of machinery, which form a substantial amount of the business done with the EFTA. Orders for castings are received from Scandinavia from time to time by foundry concerns in this country, but at the same time, Germany also supplies this market with castings—this representing business which could be captured. If the prognostication about papermaking becomes realized, the foundries making castings for British manufacturers of paper-making machinery will no doubt feel competition. Similarly, the market for domestic cooking- and heating-appliances is a difficult one, as design is as important as efficiency and in this respect national tastes vary. At least for Sweden and Norway, the main fuels used are electricity and wood, the latter not really being catered for by our manufacturers. The sale of baths on the other hand, could be usefully exploited by UK founders, especially as the years progress and the tariffs are substantially reduced. Foundry owners should certainly procure a copy of this booklet even if they do no direct exporting, as at least it will enable them to talk quite expertly with those of their customers who do sell abroad.

* Published with the sub-title "A Guide to the Stockholm Convention" by the Federation of British Industries, 21, Tothill Street, London, S.W.1.; price 7s. 6d.

Shell Moulding—When and How

Speaking at the National and Midland Ironfounders' Association's quarterly meeting on January 13, Mr. D. A. Taylor of the British Cast Iron Research Association remarked on the curious fact that founders had taken shell moulding, which was a type of coremaking process, and had used it for making moulds and had used the CO_2 Process, which was principally designed for making moulds, for making cores. The difficulties which had arisen from this situation had led many founders to give up the processes, but Mr. Taylor suggested that they should consider using them for their proper functions.

Proper Spheres of Application

Shell moulding, Mr. Taylor stated, should only be used where it conferred distinct advantages, as, for example, when it completely eliminates a machining operation, or when a higher price could be obtained for the casting. If a completely new foundry was being set up, due consideration could be given to the possible installation of shell-moulding plant, but there was often no advantage in installing such a plant in a foundry which was already equipped to produce green-sand moulds. Shell-moulding equipment was expensive because the pattern must be accurate, incorporate all gates, runners, and risers, and be fitted with ejectors and stripping pins. The cost of the moulding material, *i.e.*, sand and resin, was much higher than that of sand and conventional binders. The time required for the curing of the shell often limited the speed of production to a rate of about 20 to 30 shells per hour.

On the other hand the process was easy to operate and did not require skilled labour. It was accurate, since the shell conformed exactly to the pattern, and there was no expense for sand plant. For the production of cores, the shell process had many advantages and few snags; shell cores were produced in a metal corebox heated to the required degree, which was first filled with the sand/resin mixture. After a suitable dwell-time, surplus material was poured out and a hollow core was thus produced. It had the advantage of being strictly accurate, without joint-lines, it was permeable, and its cost compared favourably with linseed-oil-bonded cores.

Summing up, Mr. Taylor said that firms should not rush into using shell moulding but should give the matter careful consideration from the point of view of the particular casting involved, as to how much would be saved on machining, and the price at which it could be sold. If there was no saving on machining, the job would probably be cheaper to mould in green-sand. For coremaking he considered that there was a good future for the shell process and that new materials would become available in the next few years.

The talk was followed by considerable discussion and Mr. Taylor answered questions put to him in a manner which was greatly appreciated by the audience.

Association Technique de Fonderie Congress

The annual congress of the *Association Technique de Fonderie* will this year be held in Bordeaux from June 26 to 29. The arrangements so far established for this function, the 33rd of its type, include a sight-seeing trip on the Sunday, June 26; technical sessions on Monday; works visits on Tuesday, and on Wednesday a works visit and an excursion are envisaged. The congress dinner is to be held on the Monday evening.

Forthcoming Events

FEBRUARY 8

Institute of British Foundrymen

Lancashire branch: "C.T.I.F.—Ulmer Hot-blast Cupola," by G. Ulmer of the *Centre Technique des Industries de la Fonderie*, 7 p.m., at the Midland Hotel, Manchester.

FEBRUARY 9

Institute of Vitreous Enamellers

Scottish section: "Choosing a Suitable Enamel," by Dr. B. K. Niklewski, Plough Hotel, Stenhousemuir.

Institute of Welding

Slough section: "Design for Welding," by F. Brooksbank, 7 for 7.30 p.m., at the Lecture Room, Community Centre, Farnham Road.

Institute of British Foundrymen

Coventry and district section: "Moulding Sand from the Mill to Shake-out," by W. B. Parkes, 7.30 p.m., at the Coventry Technical College, Room A5.

FEBRUARY 10

Women's Engineering Society

London branch: "Uses of New Metals," by Prof. J. G. Ball, 6.30 for 7 p.m., at Hope House, 45, Great Peter Street, Westminster, S.W.1.

Institution of Plant Engineers

Western branch: "Planned Maintenance Preventive Schemes," by T. H. Voss, 7.15 p.m., at the Grand Hotel, Broad Street, Bristol.

Institute of British Foundrymen

West Riding of Yorkshire branch: "Moulding Sand from the Mill to the Shake-out," by W. B. Parkes, 7.30 p.m., at the Bradford Institute of Technology.

FEBRUARY 11

Society of Instrument Technology

"Measurement, Automatic Control, and Data Reduction as applied to a Cyclic Plant," by T. A. Lucas, 6.30 for 7 p.m., at Manson House, 26, Portland Place, London, W.1.

Institute of British Foundrymen

Beds. & Herts. section: "Use of Epoxy Resins for the Manufacture of Foundry Patterns," by H. G. C. King, 7.30 p.m., at K. & L. Steelfounders and Engineers, Limited, Letchworth.

Society of Chemical Industry

Corrosion group: "Recent Researches in the Corrosion and Protection of Iron and Steel," by Dr. J. C. Hudson, 7.30 p.m., at the College of Technology, Byrom Street, Liverpool (Joint meeting with the Liverpool section of the Society, the Liverpool Metallurgical Society and the Science Society of the Liverpool College of Technology).

FEBRUARY 13

Institute of British Foundrymen

Newcastle and district branch: "Application of S.-g. Iron in Industry," by J. C. Robinson, 6 p.m., in the Neville Hall, Westgate Road, Newcastle-upon-Tyne.

Scottish branch: "Efficient Operation of Oil-fired Tilting Furnaces," by A. L. Sharp and C. Docherty, 3 p.m., at the Royal College of Science and Technology, George Street, Glasgow.

Metallurgy Refresher Courses

The Department of Metallurgy, Battersea College of Technology, London, S.W.11, has organized a number of refresher courses for older graduates to be given at the College during the Easter and summer vacations in the current session. The courses will last three to four days and will be given by members of the College staff and visiting lecturers. For the first courses planned the programme is as follows:—"Structure of Metals and Alloys," April, 1960; "Developments in Foundry Practice," July 1960; and "Austenite Transformation—The Present Position," September 1960. The courses are intended for metallurgists who, having completed their academic studies some years ago, may now like to survey the present state of knowledge in fields additional to their own speciality.

Cast-steel Wheels for Railway Trucks

By D. S. C. Fraser

One of the most highly mechanized steel foundries in the world is the new plant in Manitoba, Canada, of Griffin Steel Foundries. Mechanical equipment, graphite moulds, and a pressure-pouring system combine to provide favourable working conditions in the new works.

At the sound of an alarm, workers in the vicinity of the two electric-arc furnaces in Griffin Steel Foundries' new plant, in Canada, turn to watch as another 11-ton charge of molten steel is poured from the huge tilting furnace into an insulated transport ladle, to begin its transition to railway wheels. Production of cast-steel wheels for railway freight trucks was launched early in February in the new, highly automated plant in the Province of Manitoba. These wheels, to which Griffin have given the trade name EQS (electric quality steel), are produced by a process of forcing the molten metal, by air pressure, up into permanent graphite moulds. The new works cover an area of 104,000 sq. ft. on a 4-acre site east of the town of Transcona, and has a potential capacity of 11,000 wheels per month. Since the as-cast weight of a wheel is about 725 lb., daily requirements of hot metal will be nearly 200 tons with full production.

Plant operation is directed by John T. Bagnall who, together with a nucleus of trained foundry engineers, electricians and maintenance crews, came to Transcona from Griffin's main Canadian plant in Ste. Hyacinthe, Quebec. The balance of personnel were recruited in the Winnipeg area, after a series of aptitude tests. 85 per cent. of these men are production workers, who keep the plant working 24 hours a day, five days a week. Griffin Steel Foundries is a wholly-owned subsidiary of American Steel Foundries, which, besides the two Canadian plants, operates three others in the United States. When in full production, it is believed that the five plants together will produce more steel per hour than any other foundry group in the world—60 tons an hour!

Official Opening of the New Foundry

The new foundry was officially opened on July 10, 1959. On that occasion, Mr. Goff Smith, president of the company, said that, because of heavier freight loads and greater speeds, steel wheels were now being fitted to all new railway trucks, and being used as replacements on all trucks less than eight years old. The Ste. Hyacinthe plant supplied new truck needs, he said, while the Transcona installation met the replacement wheel requirements of the two Canadian railroads. Transcona had been selected as the ideal location because of its proximity to both customers. Mr. Smith also said that 800,000 steel wheels were now in use in North America, and their life span of 10 to 12 years was approximately twice that of the old-style iron wheels. Demand was expected to increase, he continued, since railway expansion in Canada was proceeding at a more rapid rate than in the USA, with a marked increase in the total tonnage of freight hauled. Because Canada lacked the roads to permit diversion of freight traffic, and because the country was in an earlier stage of development, the future for cast-steel wheels appeared bright, he concluded.

In setting up the plant, the firm had carried out considerable experimental work to develop graphite as a mould material. The use of graphite moulds has resulted in considerable savings, because good surface finish and accuracy of dimensions are attainable, machining of the castings involving only a rough boring operation.

Graphite as a Mould Material

Graphite has several desirable characteristics as a mould material, but it also presents a number of problems if it is to be used successfully for this purpose. Griffin's aim in adopting the graphite mould was the elimination of those casting defects which occur only when using sand moulds, with consequent savings in fettling costs. The good surface finish and dimensional accuracy of castings poured in graphite moulds also make most machining operations unnecessary. Other desirable properties of graphite include: (1) low coefficient of expansion, which gives close dimensional tolerance of the casting; (2) good resistance to thermal shock from the high temperature of molten steel, and (3) ease of machinability of the mould cavity.

On the other hand, graphite will not withstand rough treatment, and is seriously susceptible to metal erosion. The moulds must be of correct permeability, since if the density of the graphite is too high, blowholes and a rough casting surface will result; a too-low density will allow metal penetration, erosion and spalling. Much of the research done on this process, in which the Great Lakes Carbon Corporation participated, was concerned with development of suitable graphite for the moulds. A general view of the moulding area at Griffin's works in Manitoba is given in Fig. 1.

Because graphite erodes so easily, Griffin were forced to adopt a special pouring technique. Pouring by the conventional method caused much mould erosion, and other problems also arose. The method adopted to overcome these problems consists of forcing the molten metal up into the mould cavity by air pressure at a closely controlled rate.

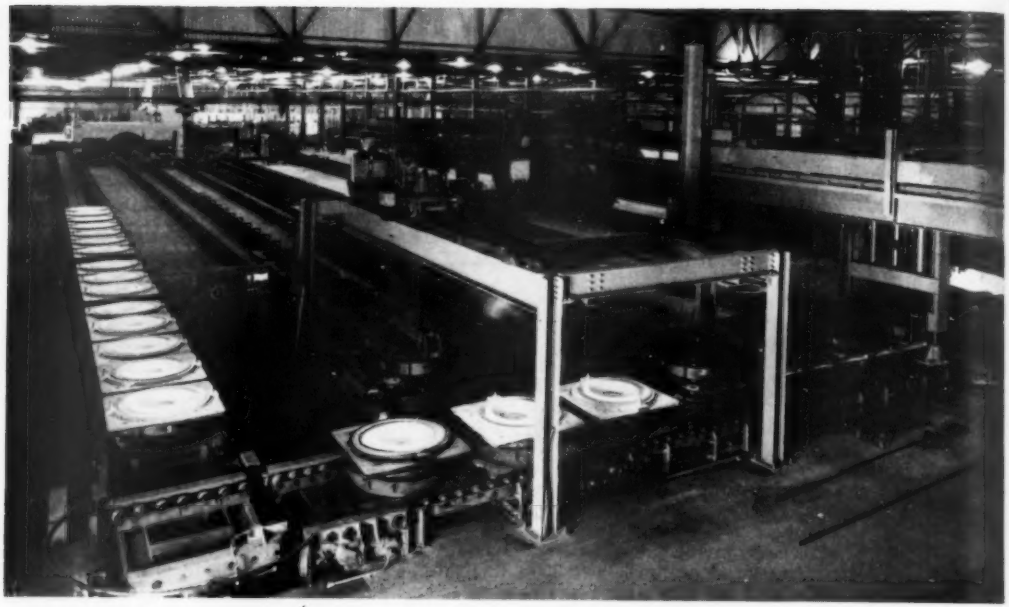

FIG. 1.—*General view of the moulding area at Griffin Steel Foundries' highly-mechanized works in Manitoba, Canada.*

This rate of flow fills the cavity sufficiently fast to prevent cold shuts, scabs or wrinkles, but does not cause mould erosion.

Moulding

The graphite mould halves, 42 in. dia. and 18 in. thick, are encased in metal flasks for protection. The wheel contour, which becomes the mould cavity, is machined into the mould halves by a vertical boring mill. During the continued use of these moulds, surface imperfections develop which require remachining of the moulds to their original contour. About 1,000 wheels are obtained from each mould before it has to be scrapped. The wheel is fed by four heads, one located above the hub and three spaced 120 deg. apart on the rim fillet of the wheel. The heads are insulated from the graphite by shell core sleeves, to ensure good feeding and to protect the riser holes. Griffin Wheel were one of the first companies in the United States to use a shell-mould sand mix for this purpose. Cores are also used to cast in the trade mark and serial number. Dimensional accuracy in the graphite-mould process is of the order of 0.1 per cent. of the original dimension.

FIG. 2.—*Immersion of the spout in the molten metal, in preparation for pouring.*

Melting

Two 20-ton bridge cranes, equipped with 7½- and 10-ton auxiliaries, handle the transfer of weighed charges to the melting furnaces, and ladles to the pouring tank. Commercial scrap and old wheels are used to charge the two top-loading furnaces. When melted the charge is tapped from the electric-arc furnaces into an insulated ladle (after laboratory control analyses have been completed). The ladle is then transported to the slagging bay, where a worker (protected by a shield from the intense heat) scrapes the slag from the surface of the molten metal. It is then placed by crane into the

steel pressure-pouring tank imbedded in the floor. After the slag has been removed from the molten metal surface, and a temperature probe has revealed the desired degree of heat, a cover with pouring spout or tube attached is placed over the top of the tank (see Fig. 2), and held down by a pressure of 3,000 lb. per sq. in.

Pouring

Moulds arrive at the pouring tank on a walking-beam conveyor. They are then lifted into position by crane and clamped over the top of the pouring tube. Dry air is introduced into the tank at a pressure of 40 lb. per sq. in., forcing the metal up the tube into the mould—this operation is controlled by pushbutton. Total time required to fill the mould is about 20 sec., the metal temperature being about 1,593 deg. C. When the operator sees the metal near the top of the heads, he stops the pour by pushing another button (see Fig. 3). Simultaneously, and automatically, an air-activated plunger with a graphite plug fitted to one end is driven through the molten metal and seated in the drag. This plug prevents the metal from running out of the mould as the air pressure is shut off and the tank is exhausted—all automatically. The metal below the stopper in the pouring tube then flows back to the ladle. The poured mould is returned to a walking-beam conveyor leading to a cooling kiln, and within approximately five min. the casting solidifies. The high heat conductivity of the graphite mould permits the casting to solidify more rapidly than is the case with conventional sand-moulded castings.

Knockout and Machining

After the mould cope (top half) has been removed, the cast wheel is lifted off the mould by its hub (see Fig. 4) and placed on a conveyor, which moves it slowly through a brick-lined cooling kiln. Meanwhile, the cope moulds move down their conveyor system, the heads are pushed out, and the sand-walls of the heads broken off to fall through to the basement below. Then, the moulds go to the core-baker, where new sand walls are rebaked, to the spray booth, to the new stopper-setting position, and finally down to the foundry for use again. (The risers are tubes which feed metal into cavities forming in the casting as the metal cools.) The drag mould is similarly cleaned, re-sprayed and returned to the foundry again.

FIG. 3.—*This wheel has just been poured. Flames come from the feeder-heads at the rim fillet and hub.*

After the wheel emerges from the kiln it passes to the "sprue wash," where the feeder stubs are washed off by an electric-arc air torch and the wheel is rolled over prior to chipping out the graphite stopper. The next operation is the cutting out of the solid hub in which the shaft of the stopper plunger is still encased. This cutting opera-

FIG. 4.—*Removing a wheel from its drag—another cast-up mould can be seen on the conveyor at the left of the picture.*

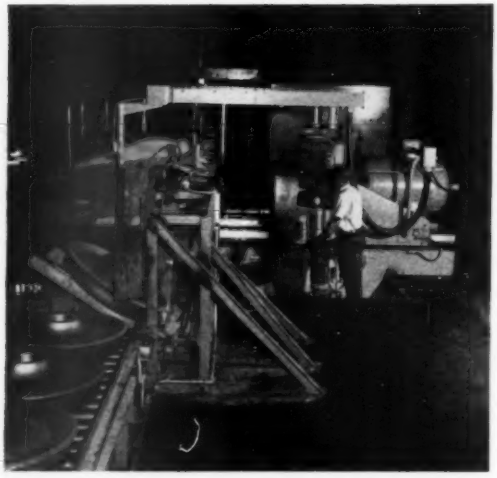

FIG. 5.—*The final stage in production, in which the wheels are bored according to specification.*

tion, largely automatic, is performed by machine in two min., and gives a smooth and accurate bore to the wheel, this bore varying according to the customer's specification (see Fig. 5).

Heat-treatment

At this point the wheel, its temperature having fallen to below the critical point, is moved by conveyor to a rotary, gas-fired annealing furnace. This furnace has four heat zones with temperatures ranging from 927 to 871 deg. C., and the wheels are held in it for 1½ hr. On emerging, the wheels are given a controlled air blast in their hubs to equalize the cooling rate throughout the casting. When cool, the wheels are moved to the cleaning room, where they are put into the "Wheelabrator" to be cleaned by an air-less shotblast. Succeeding steps include Magnaglow testing, preliminary visual inspection, machining of the bore, final inspection and weighing. If at any of these final stages a defect is detected, it is immediately corrected—or the wheel is scrapped. No compromise in quality is considered.

Conclusion

The most striking feature of the new works is the unusually good working conditions, which have resulted largely from the nature of the moulds used, and the pouring process employed. With push-button controls, gravity conveyors, automatic clutches, etc., the plant is claimed to be the most highly-mechanized wheel foundry using this process in Canada. The process explained in this article was developed after 10 years of research, and was first used at Griffin plants in Chicago, and also near Montreal.

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NOTE.—Co-operative research has led in recent years to the American Brake Shoe Company concentrating on the 1.5-per cent carbon wheel (cast in conventional sand-moulds), and the Griffin Wheel Company on the 0.75-per cent carbon wheel, pressure-poured in graphite moulds. Although the article reproduced here only deals with activities of the Griffin Wheel Company, for the sake of completeness this bibliography records articles about the wheelmaking plant of both companies.

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(4) "How X-3 Car Wheels are made." *Railway Age* (*N.Y.*), April, 1953, **134**, 84–87. (BSCRA *Abstracts*, 1953, **2**, No. 553.)

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(6) "Method and Apparatus for forming a Riser Cup in a Mould," Griffin Wheel Company, Chicago. (BSCRA *Abstracts*, 1955, **4**, No. 329.) (British Patent No. 721,090.)

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* Made available by courtesy of the British Steel Castings Research Association, with cross-reference to their own abstracts.

BMC Factories for Development Areas

Hopes in areas of greatest unemployment that relief would come from the motor-car industry have now been realized. Negotiations with the Government by the British Motor Corporation, Limited, over its £49,000,000 expansion programme have resulted in the decision to spend nearly £21,000,000 over the next two years on building and equipping new factories to provide more than 11,000 new jobs in Scotland, South Wales, and Merseyside. Similar development plans by others of the "Big Five" in the industry are likely to follow.

BMC plans to move the manufacture of heavy commercial vehicles and tractors from Birmingham to Scotland where an £8,800,000 factory will provide jobs for 5,600. Another new factory costing £7,500,000 is to be sited between Llanelly and Trostre, near the sheet-steel manufacturing resources of west South Wales and close to the Trostre works of the Steel Company of Wales, Limited. This plant, together with an extension of the existing radiator factory at Llanelly, will employ 4,200 and will provide pressings and major sub-assemblies for the Midlands works.

Third of the new factories will be a £4,200,000 plant at Kirkby, near Liverpool, employing 1,500 workers, where BMC intends to re-locate the domestic appliance production of Fisher & Ludlow, Limited.

While South Wales and Liverpool have warmly welcomed the BMC plans, Scottish industrial and union leaders, in their various ways, have voiced a wish that the share for Scotland, where unemployment in December rose to 98,000, could have been considerably more.

Compensation for Compulsory Purchase of Land

By Lord Meston

It is hoped that land owned by founders is never going to be acquired compulsorily by Government or Local Authority. But these things do happen sometimes, however much it is to be deplored, and it is as well to know what compensation may be obtained in such cases.

In considering the subject of compensation for compulsory purchase of land, it is useful to first examine briefly the past history of the subject, It is, however, unnecessary to go further back than the Town and Country Planning Act, 1947. This act transferred to the State the development rights in all land, and provided for a once-for-all payment of compensation for loss of development value, which was limited to a total figure of £300 million. When development was allowed, the developer got back from the State the development value which he was then realizing, and for that he paid a charge equal to the whole of the development value—that was the development charge itself. In practice, the development charge acted as a brake on development, and so the Town and Country Planning Act, 1954, provided that claims against the £300 million would be paid only when the owner of the land suffered loss either by a planning refusal or by a compulsory acquisition. In this way compensation for compulsory acquisition became "existing use value plus the 1947 development value (if there happened to be any)."

Original Limit on Development Value

That was the cause of the trouble. On compulsory acquisition the element for "development value" was limited to the figure for the year 1947. Therefore, in subsequent years (1947-1958), the price paid on the compulsory acquisition of "undeveloped land" was often very much less than the full market price which the owner could get in a voluntary sale in the open market. In particular, on the fringes of towns and cities, development values had considerably risen since 1947. The result was that a big gap developed between the market value of "undeveloped land" and what was payable on compulsory purchase. Sometimes, indeed, the market value was as much as three or four times the compulsory purchase price. On an average, market value for "undeveloped land" was at least 40-per cent. greater than the compensation actually paid. It is only fair to say that in the case of "developed land" there was not generally much reason for complaint, because "developed land" has no value for development beyond its existing use.

The New Act

Now the old system has been swept away. The Town and Country Planning Act, 1959, was passed on July 16, 1959, and came into operation on August 16, 1959. So far as the compulsory acquisition of land is concerned, the first act in the machinery of acquisition is the service of a "Notice to Treat" for the land in question. The 1959 Act introduces a new basis of compensation in relation to all acquisitions in pursuance of "Notices to Treat" served after October 29, 1958. Disregarding legal phraseology and complications and getting to the point, the new basis of compensation for the compulsory acquisition of land is "market value," that is, "the amount which the land, if sold in the open market by a willing seller, might be expected to realize."

Once upon a time there was no, or very little, difficulty about ascertaining the "market value" of any particular property. But with the introduction and growth of town and country planning, the question of "market value" has lost its old simplicity. What the land would sell for (in the absence of compulsory acquisition) turns on planning control. That is to say it turns on planning consents that have already been given or that might reasonably be expected. The development plan for the area, as approved by the Minister, is a guide to the planning permissions which are likely to be obtainable.

What Sort of Development?

The short question is: What sort of development would be allowed if the land were not required for public purposes? To answer that question the Town and Country Planning Act, 1959, makes certain general assumptions as to planning permission, followed by some special assumptions in relation to land comprised in development forms.

First, it is to be assumed that there is permission for the development for which the land is being bought. For example, if one owns a piece of land and there is in existence planning permission to build houses on that land, then the valuer has to ascertain the market value of that land with the benefit of housing permission attached thereto.

Secondly, it is to be assumed that there is permission for development for the use for which the land is defined or allocated in the development plan. For example, if one owns a piece of land, and the Development Plan shows that this land is in an area which is allocated for industry, the valuer has to ascertain the market value of that land with the benefit of permission for industrial development attached thereto.

Thirdly, there are some cases where, (*a*) there is no express planning permission in existence in relation to the land, and (*b*) the provisions of the

Compulsory Purchase of Land

Development Plan do not give a clear answer to the question: What kind of development would have been allowed here if the land had not been needed for public purposes?

It may happen, for example, that someone owns a piece of land for which there is in fact no planning permission in existence. This does not necessarily mean that planning permission of any description has been refused; it may mean that the owner has never wanted, or found it necessary, to make an application for any kind of planning permission. In that case he must examine the Development Plan for the area in which his land is situated. He may find that no type of development (housing, industrial, or any other kind) has been allocated to this particular area. Or it may be that the Development Plan has allocated some development for the area in such wide terms that half a dozen different constructions might be placed on the meaning of the allocation.

Need for a Certificate

In all these cases where there is either no express planning permission in existence or the Development Plan affords insufficient guidance in the matter, then the owner of the land in question or the acquiring authority may apply to the planning authority for a *Certificate* saying what development, if any, might reasonably have been expected to be permitted if the land were not proposed to be acquired compulsorily. If the owner of the land does make an application for a *Certificate*, he must suggest what types of development he thinks would be appropriate for the land, and must duly notify the acquiring authority of what he is suggesting. The planning authority can either agree with the owner as to his suggestions for the type of development which might reasonably be allowed, or reject the owner's suggestions and submit their own views on the subject. At all events the planning authority must issue a certificate containing a statement as to what development, if any, might reasonably have been expected to be permitted if the land were not proposed to be acquired compulsorily. The valuer can then proceed and value the land on the basis of market value, with the benefit of the planning permission as stated in the certificate. An appeal lies to the Minister of Housing and Local Government against a certificate, or against the local planning authority's failure to grant a certificate. It must be remembered that this certificate procedure is something entirely new—it will be interesting to note how it works in practice. As a famous Statesman once said: "We must wait and see."

Change of Intended Use of Land

What happens if land is bought for one purpose and subsequently used for a more profitable purpose? Take a simple example: A man owns a piece of land to which planning permission for housing development is attached—that land is compulsorily acquired by the local authority for housing purposes. That is quite a simple proposition, and the owner is duly compensated on the value of land with permission to build houses thereon. But the local authority subsequently change their mind. They do not build houses on the land but decide to use it for industrial purposes; in other words they may build (or let other people build) foundries on the land, after obtaining planning permission for that purpose. Incidentally, the local authority make a nice profit out of the transaction. The amount they obtain from industrial development is considerably more than for building houses on the land. If the owner had known originally what the local authority were in fact going to do, would he have been satisfied with compensation on the basis of using the land for housing purposes? The answer is, of course, that he would have held out for more, namely, for compensation on the basis that the land was going to be used for industrial development.

Original Owner's Redress

In such a case, what could the owner have done in the past by way of opening the original transaction with the local authority? The answer is—nothing, but curse his bad luck. To-day, however, there is a very effective remedy. The Town and Country Planning Act, 1959, provides that the original owner of the land can claim additional compensation if a new planning permission is obtained *within five years* of the completion of the acquisition. That it to say, the owner will be entitled to claim from the acquiring authority the additional compensation, if any, which he would have received if the new permission had existed at the date of the Notice to Treat.

Conclusion

It is gratifying to know, however, that if the owner is originally paid compensation on the basis that planning permission exists for some purpose, and then the local or acquiring authority subsequently use the land for some less valuable purpose, there is no question of the owner having to pay back any part of the compensation which he received.

POA "Minibition"

The 1960 "Minibition" organized by the Purchasing Officers Association will be held in The Spa, Scarborough, from September 29 to October 1. This exhibition, which as its name implies, is a miniature one in which the stands are all of uniform construction with a platform size of 3 by 5 ft., is planned as an educational feature at the Association's National Conference. It gives manufacturers an opportunity to show their products to buyers for industrial concerns and public undertakings. As usual there will be a competition for the best displays, divided into two classes, educational and display. Further details may be obtained from the secretary of the Purchasing Officers Association, Wardrobe Court, 146a, Queen Victoria Street, London, E.C.4.

SECTION DEVOTED TO THE TECHNOLOGY OF PRODUCING DIMENSIONALLY-ACCURATE CASTINGS

Shaw Process Licensees' Conference

Abstracts of Papers and Points from Discussions

While the proceedings of this conference of licensees using a specialized foundry process legitimately occupy space in the JOURNAL'S "Dimensionally-accurate Castings" section, it can be claimed that many of the facts reported have wide applicability to the general business of founding. Comments on foundry practices, business climate, possible new fields open to cast products, the use of profiled backings for moulds, new melting techniques and systematic study of defects are likewise capable of relation to other fields of operation. Furthermore, in the search for greater accuracy and uniformity, foundrymen using different processes are, in a degree, competitive one with another and knowledge of what is being done in the field can be very useful.

At the one-day conference attended by about 30 European licensees of the Shaw Process of precision casting held this autumn in London, several technical contributions were presented. What follow are brief abstracts of various papers given and salient points from some of the discussions.

Large-size Precision Casting made of Cast Iron by the Shaw Process

By Osamu Madono (Riken Piston Ring Ind. Company, Limited, of Japan)

As Mr. Madono was unable to be present at the meeting, Mr. C. Shaw read the paper on his behalf. The paper was a description of the production by the Shaw process of a large-sized cast-iron press-tool for forming an automobile body-panel. The press-tool consisted of a punch and die, each having a weight of over one ton and a size of three by five ft. The Author pointed out that when producing such a casting in iron by ordinary methods in a sand mould, there was a disadvantage in that it could not be cast to conform very closely to the finished shape required.

When the Shaw Process was used for this job, the master pattern was made of plaster, using a shrinkage allowance of 0.009 mm. per mm. Before the Shaw mould—a "shell" only—was made, a back-up portion was produced with CO_2-bonded sand, after covering the plaster pattern with a layer of clay corresponding to the thickness of the Shaw-Process "shell" desired. The composition of the sand employed for the CO_2 moulding was: Silica sand 100 parts, sawdust 30 parts and silicate binder 5 parts. The sawdust mixed with the sand played an important rôle when producing the mould, as it prevented large cracks appearing due to the remarkable expansion of the CO_2-sand when heated. Another advantage of the use of sawdust was that, since it was easily burnt off on firing the composite mould in the furnace, it was easy subsequently to release the Shaw-Process shell from the sand-mould backing.

Making the Shell

The next operation was to cast Shaw-Process slurry to fill the space between the CO_2-Process backing and the plaster pattern, after the clay thickness had been removed. This was done through ingates prepared beforehand in the CO_2-bonded material. The Shaw slurry consisted of 100 ml. of binder to 350 gm. of refractory material—somewhat stiffer than usual. After burning-off the alcohol and firing, the Shaw-Process mould-shell was turned over and re-invested with CO_2-Process sand in preparation for casting, together with the top half-mould which was wholly of CO_2-Process sand, and which incorporated the chequer-form ribbing of the back of the die. The cast iron for the press-tool had a composition of C, 3.5; Si, 1.67; Mn, 0.3; S and P, 0.35 per cent., and was melted in an electric-arc furnace.

The paper concluded with a description of the method of pouring and cooling the casting, which had a sectional thickness of 40 mm. (1½ in.). Though there were small differences in the degree of shrinkage, a most satisfactory result was obtained in the as-cast condition. It was interesting to note that the die-punch casting made in a similar manner matched that of the die so completely that little finishing was required to correct both. This, the Author attributed to the fact that instead of directional differences in shrinkage, both castings were subjected to contraction in the same degree and in the same direction.

Discussion

Replying to a question about shrinkage, Mr. Lubalin said that considerable scatter was expected in shrinkage measurements when making large castings. An allowance of 0.005 in. per in. had to be provided, but on repetition jobs, naturally, adjustments could be made to the pattern equipment based on results secured. Other points arising were

The Paper by G. P. Welch is shortly to be printed *in extenso*.

that the value of waiting until the casting reached room temperature before knocking-out lay in avoiding distortion—a factor of great importance, for example, when casting tool-steel. The necessity was stressed for time control on all operations so as to secure dies having really close tolerances—here an air-conditioned room had great advantages if founders were going after the last " thou'."

Development of Semi-permanent Backings for Composite Moulds

By H. J. Marshall (of Shaw Processes' continental concessionaires)

This paper concerned the substitution of composite moulds for those containing massive elements of ethyl-silicate-bonded material—which were naturally very expensive. Semi-permanent backings made of chamotte or " compo " bonded by the CO_2/silicate process had been developed to the stage of full industrial application. They were being used, for example, in making impellers and stainless-steel propellers of fair size. To produce an impeller for a self-priming pump, Mr. Marshall cited the following direct labour times: All Shaw refractory—22 min. each; chamotte-backed moulds —7 to 10 min., and using semi-permanent backing —5 min. One foundry using the modified process had three times the output that it had two years ago, and only three people were now engaged on mould making instead of six.

Discussion

In discussing this contribution, an American delegate said in the US much research had been directed to substitution of zircon—using material of Florida origin—and quoted details of a facing material developed. Only one Australian zircon had been found suitable, he said, the others being too oily. Some sillimanite reclamation was carried out in France and the US, he reported, but the purity of the reclaimed material was suspect. Zircon, having a round grain-shape, needed crushing to the particle size and shape of the sillimanite before it could be substituted, but then it must be borne in mind that with zircon, almost twice the size of mould piece could be produced from the same amount of binder, and better chilling of the metal resulted, he concluded.

It appears that US emphasis on the production of Shaw-cast dies stems from the very high labour cost of tooling in that country, where wage rates are of the order of $6 (£2) per hour. Another speaker remarked that semi-permanent " preforms " needed special attention to shrinkage—for example, cardboard could be inserted between the backing and the mould and would burn out during firing. Assembly of composite moulds when hot was one of the disadvantages of the new process, it was reported.

Quality Control of Shaw Casting

By L. F. Hayward

As an introduction to his paper, Mr. Hayward, who is employed at Guest, Keen and Nettlefolds Laboratories, said that the Shaw moulding process had been employed by his firm for several years. The major part of the research and subsequent development programmes concerned the production of dies for precision forging. After discussing the firm's quality-control system, the Author continued by listing the causes of scrapped castings, and grouped them under the various sections of the foundry process, *viz.*, those attributable to the pattern, mould-making, the metal and the finishing processes. He then went on to explain each defect, its probable cause and methods used by his firm in attempting to reduce or eliminate the particular defect.

The first seven defects he mentioned arose, he said, from faults at the pattern stage, and these he listed as bad finish, adverse taper, bevel, damaged pattern, distorted pattern, and bad plaster. Defects arising from moulding fell roughly into eight categories, *viz.*, rough mould, air entrapment, dimpled surface, mould distortion, general shrinkage, uneven shrinkage, " flash," and bad alignment. In Shaw-moulded castings, defects due to the metal were almost always to be associated with the steelfounding, he said, and listed the following as being the most likely causes—slag, shrinkage, porosity, misrun, scrabbing, mould erosion, burn-on, dirty mould and decarburization. Finally, such defects as were due to finishing operations: file marks, tool marks, saw cuts, etc., were enumerated. The Author pointed out that it was not suggested that these defects were necessarily the causes of castings being scrapped, but merely causes of poor castings. He considered that a quality-control system, similar to that in operation at his company's laboratory, was essential when practising any precision-casting technique—the resulting reduction in the scrap rate would always outweigh the small extra cost involved.

Discussion

A member of the audience asked Mr. Hayward if production-control was also covered, as well as quality-control. The Author replied that records needed to be grouped according to the product. On the question of the characteristic " dimple " defect, a delegate from the USA said he related this defect to a late silicon addition when used as a steel deoxidant.

Experiences in using the Argo-Vac Arc-melting and Vacuum-casting Furnace

By P. A. M. Cooke

Mr. Cooke, who is employed by D. Napier & Son, Limited, commenced his lecture by describing a low-pressure, indirect-arc furnace*, and went on to detail minor modifications which had been made

* See Equipment and Supplies, JOURNAL, June 26, 1958, p. 777.

to it at Napier's work. These were the addition of a loading mechanism, a means of controlling the temperature by immersion pyrometer and the changing of the bell flange. The new flange, Mr. Cooke said, was ¾ in. thick. All the water connections had been enlarged to increase the flow of water to prevent vapour-locks in the cooling system.

Next, Mr. Cooke gave details of the operation of the furnace as follow: The mould was clamped on top of the furnace, over the pouring tube; the vacuum bell was replaced and the furnace evacuated. Power was then switched on to the electrodes and the carbon gap adjusted by means of the winding gear. In the initial stages, the metal had to be cut up into small lengths and loaded into the furnace before clamping on the mould. However, the incorporation of the charging mechanism mentioned had overcome this difficulty and had materially decreased the time of melting. Types of metal melted by his firm included Alumel, Chromel, G.M.F. 235, Nimocast 90, S.80, S.62, and Jethete 152M alloy. Next, the Author described the results obtained using the vacuum-casting furnace and dealt with each type of metal separately. In conclusion, he said that losses of constituents when low-pressure melting appeared to be distinctly lower than those experienced by high-vacuum melting. Carbon checks were made on every casting, and the average losses were no greater than the average pick-up associated with conventional carbon-arc furnaces, *i.e.*, approximately 0.02 per cent.

Discussion

At the beginning of the discussion, members attending the conference were invited to visit D. Napier & Son, Limited, to inspect the furnace at first hand should they wish to do so. The first question was whether melting time was increased using the furnace described. To this, Mr. Cooke answered that the time was in fact somewhat more lengthy, but operating procedure was not too complicated for ordinary foundry personnel, he told a further questioner. Replying to another query, Mr. Cooke said that the vacuum of from one to five mm. could be obtained from a single-stage pump and there was much lower electrode consumption at vacuums of this order as compared with higher vacuums. Another member asked whether lack of atmospheric pressure in feeding a casting presented any difficulty and to this Mr. Cooke replied in the negative. In reply to another question, the Author said there was a definite improvement in surface finish and definition of castings when using the furnace he had described.

Setting-up a Shaw-Process Foundry

By D. B. Winter (Innsworth Metals, Limited—a member of the Dowty Group

This paper described the setting-up in an organization not previously concerned with foundry practice of a small unit to operate the Shaw Process only. The Author reported that the section was staffed by about half-a-dozen people and had been in existence for two years. Experience had substantiated his preconceived view that it was easier to get really sound castings in a variety of metals with inexperienced personnel by the Shaw Process. A factor, he thought, which would be of importance to other non-foundry concerns considering setting-up a Shaw-Process foundry was the value of having a highly-skilled, versatile and practical foundryman as the nucleus of the staff. In the body of his paper, Mr. Winter listed a number of factors involved in producing accurate castings and analysed them as to their potency, always aiming at a working tolerance of 0.006 in. per in. for the castings produced.

Discussion

One questioner asked whether a high-expansion plaster could be used for patterns (material with as much as 0.015 in. per in. expansion was stated to be available). Such a material would be potentially useful for patterns for steel castings and/or for producing one-off castings from master models. On this point, it was reported that high-expansion plasters were used on quite a considerable scale in the United States, but very accurate prediction of the actual expansion in different parts of a model was almost impossible. However, using such plasters, it was possible to insert gauge-points in the plaster and pour around a fast-setting epoxy resin when the gauge-lengths were at the correct dimension. The problem of stripping such models was solved by arranging their production and transfer from semi-flexible rubber box-parts. In this way, also, double-expansion patterns were theoretically feasible by duplicating these operations using the high-expansion plasters. A useful tip when using high-expansion plasters was the use of a smooth and greased baseplate or even the use of rollers on the baseplate, otherwise the plaster tended to be constricted in contact with the plate. With such plasters, it was possible to get up to an equivalent contraction to that of steel, but the finished plaster surface was not so good as that of ordinary plasters.

Shaw Processes in the United States

By Irwin Lubalin

In this report, the Author, who is general manager of Shaw Process Development Corporation, Inc., in America, described the American set-up as applied to the adoption of the Process. As such, his discourse represented a valuable pour-back of information from the United States licensees of which there are now over 40 companies operating. Mr. Lubalin commenced by saying that four years ago, a laboratory and training school for licensees had been set up and this was now "paying dividends." There were two main fields of application of precision castings of the type under discussion, namely, the tool and die field which was completely commercial, and aircraft applications which were catered for mainly in jobbing shops; these foundries

had very different problems from those of the UK, for example there was little or no prototype work in the United States because of long distances between suppliers. This meant that the precision foundrymen must go after long-run work, in competition with shell moulding, die-casting and ordinary casting—also with automatic machining as a growing competitor. The result was that Shaw founders usually got the awkward jobs—some were "winners" but more were "losers"—and there had evolved also a field only fulfilled by Shaw castings. Furthermore, in the very-expensive-alloy field, the Process provided an additional insurance for securing a good casting, a salient example here being the Lebanon Steel Company's adoption of the Process. Another field was that where a "cheaper" component replaced a "hog-out," *i.e.* a job not previously cast—for example, hollow forgings where previously 80 per cent. of the metal was machined away and the resultant part had poor test-properties in the direction of stress when forged. Sometimes such jobs could be cast at about half the previous price and use was being made of this type of application in some of the major missile projects of the US. The use of chamotte pre-forms had resolved the problem of mould costs resulting from high binder cost. These pre-forms could be made quickly in jolt/squeeze machines from CO_2/silicate bonded sands and automatic production of such shapes was possible.

American Business "Climate"

In a further section, Mr. Lubalin gave it as his opinion that more mechanization of the Process was needed—for mixing, mould stripping (possible use here of a hydraulic-bleed system), etc. At some time in the future, he thought, a fully-automatic Shaw machine would come along, as already fully-automatic plaster moulding was in operation in the States. About the American business "climate," he voiced the motto that "few Americans will pay more for a better product, many will pay the same or less!"—all this could be resolved into a matter of dimensional tolerances, *i.e.* the necessity to get down to the last few thou' on a production basis.

Factors which Mr. Lubalin put up for further consideration were that a Shaw mould was not always the same size as the pattern—there were, for example, dimensional changes due to room-temperature variation and such production variables must be controlled. Licensees in America were trying to improve on tolerances available with the lost-wax process and it could be done, the Author believed. The configuration of the casting was also a variable and here, he suggested that a "form sheet" should be drawn up to explore unusual size variations. With really expert pattern-making, trial and error with regard to shrinkage allowance was just not good enough. The variation between one casting and another could be confined (by controlling casting temperature to within 5 deg.), for example, to very small dimensions of plus or minus 0.0002 in. on 39 out of 40 castings of a 4-in. dia. die and yet the fortieth casting might be much different and this meant that somewhere the control had slipped.

Future Work

All the major automobile manufacturers in the United States were using components produced from Shaw dies, Mr. Lubalin continued, and Ford's actually had a travelling show based on this type of production. There was still a long way to go, however, and accentuation of research was needed on the metal side, pouring procedures, etc. For instance, why did some alloys, *e.g.*, iron and beryllium/copper, never give trouble? Sand casting was considered obsolete as a process amongst many United States' production engineers and the ceramic-mould field was regarded by them as the best "bet" for the future. He stressed the value of the exchange of information between licensees, but direction of individual effort was necessary, with specialization on individual problems followed by a pooling of knowledge. After briefly referring to the cast and "coin" forge process, *i.e.*, hobbing of a casting which was slightly undersize, the Author then concluded by showing a film made at Auto Specialities, Inc. This was of the production of a 40-lb. missile nozzle, specified to be made by the Shaw Process only. (Nowadays, production nozzles are being made for the "Hercules" missile weighing 800 lb. each and other new work was in hand, he added.)

Discussion

A long discussion followed on the details of the film which, "in a nutshell," put across the idea that missile engineers in the United States were "sold" on the values of precision casting, especially where multi-directional stresses were involved. The founder could nearly always provide better alloys and a better all-round job, plus greater flexibility in design.

Evolution of the Shaw Process

By W. Ball (Precision Products (Cumberland), Limited)

In this contribution, the Author recounted briefly the history of the Shaw Process and then discussed at length a particular casting that was in current production at his works, making the point that this was typical of present-day business and showed what immense progress had been made in recent years. Throughout Shaw Process operations, the Author stressed that it was always of vital importance that experimental work and saleable production should be kept in proper balance.

FURTHER COMMENTS

Discussing the two previous contributions, in addition to further questions from the floor on general matters, the following points arose:—

Apropos Mr. Lubalin's suggestion that research could be concentrated, one contributor stated that he had given two of his staff a roving commission to investigate mould and metal production phases.

Responding to a request for a coating for wooden patterns which would resist Shaw-Process binders, Mr. Noel Shaw referred to both resin lacquers and parting materials which were available to British industry. Another member said that dental sheet-wax (for example, the grade known as toughened No. 4 dental wax) when "ironed-in" would last for weeks, but such a pattern coating needed painstaking application; it could not be put on in five minutes! Yet another speaker said that he used a grade known as bar-topping varnish. Floor polish was reported to be suitable surface treatment for plastic patterns. One member then showed some notable castings produced by the Shaw Process (two of them in 18/8 stainless steel) and discussed a number of production problems which had been entailed—for example, the use of sheet-wax inserts for locating cores and for maintaining some very thin wall-thicknesses.

British Scientific Instruments in Russia

As a result of the report to the Council by the three-man delegation of the Scientific Instrument Manufacturers' Association of Great Britain, SIMA House, Queen Anne Street, London, W.1, which went to Moscow at the beginning of November, and the support from 30 members of SIMA, an exhibition of British scientific instruments will be held in Moscow from June 16 to 26. This exhibition will be the first to be put on in Russia by a British organization of manufacturers in a specialized field. It is possible that some additional exhibitors will participate and further enquiries are still being received.

Brightside Engineering's Good Outlook

Welcome improvement in demand for all the group's products has been experienced in recent months by Brightside Engineering Holdings, Limited, Sheffield, following the difficult time in the early part of the year to September 30, 1959. The chairman, Mr. Ambrose Firth, considers the outlook for the current year to be "good" and, he says, there are already signs following the General Election of a resurgence in demand for the capital goods on which the group is so dependent.

Roll shops have been operating at an ever increasing rate to cater for steelworks and non-ferrous rolling mills throughout the world and export trade has remained particularly buoyant. A larger volume of work was handled by Brightside Heating & Engineering Company, Limited, the pipeline division of which makes progress, and there is a large order-book for work both at home and abroad. Moorwoods, Limited, has had a satisfactory increase in orders for catering equipment.

The dividend is 17½ per cent. (20⅝ per cent. equivalent for 15 months) on a doubled capital. In order to reduce the disparity between payments in future, the directors propose to adopt a 5 per cent. rate for the interim, subject to any unforeseen circumstances.

THE DAVID BROWN TRACTOR DIVISION, Huddersfield, Yorks, has received from Canada an order, worth about £250,000, covering the supply of 350 wheeled-tractors, a similar number of ploughs and other items of farm machinery. Delivery was expected to start last month.

Non-ferrous Investment Foundry

Smiths Motor Accessory Division, Autop Foundry, Otterspool Way, Watford By-Pass, Herts, announce that they are now offering an investment-casting service (see Fig. 1) in a comprehensive range of non-ferrous metals. Investment casting is in some cases the least expensive method of producing small quantities of complex-shaped castings, and is therefore of special value both for short runs and for prototype work, or where design is likely to change. The first step in the investment-casting process is to make a die in brass, which is easy and cheap to machine and easily modifiable, to enable replicas of the part required to be produced in a special hard wax. The dies have a virtually indefinite life. Duplicates of this brass die are then produced in hard wax. The wax duplicates are supported in a can and invested with a refractory material, similar to fire clay but with a much finer surface. The wax is then melted out, leaving cavities in the form of the casting required, into which the metal is poured. At Autop Foundry, the maximum size of castings is usually 6 by 6 in.; in light alloy up to 1 lb. and in heavy alloy 2½ lb.

FIG. 1.—*Group of typical investment-castings made by Smiths Motor Accessory Division. All the pieces are of aluminium alloy, except the brass clock-case.*

Equipment and Supplies

Laboratory Balance

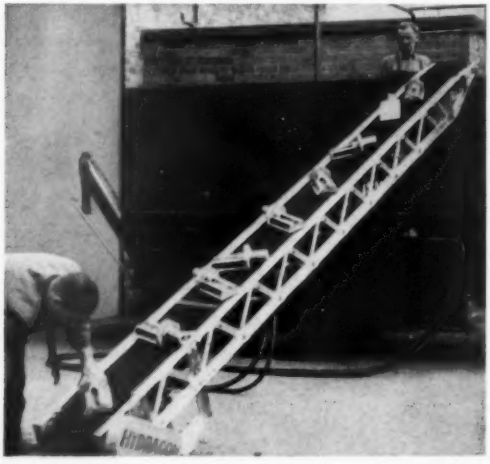
The first of a new series of balances designed for general purposes but incorporating analytical features, has been produced by Griffin & George, Limited, Ealing Road, Alperton, Wembley, Middlesex, England; known as the *Minor* model, it has a short beam for speedy weighing; an inclined scale which rises with the pointer, thus facilitating reading and avoiding parallax; a unique design in stirrups to protect knife edges, and a new design pillar allowing easy and rapid assembly. When the beam is arrested all the agate bearings are relieved. The capacity is 250 gm., and the balance is claimed to be sensitive to 2 mg.

Lorry Loader

Aero Controls, Limited, Industrial Estate, Weedon Road, Northampton, have developed, working in close association with Service Engineering, Limited, a new piece of loading and unloading equipment known as the Hydracon hydraulic conveyor (see Fig. 1). It is claimed that this unit will handle castings, packages, sacks and other small units, in single or multiple loads, of up to 120 lb. weight. Heavier loads can be accommodated by the use of ball-bearing idlers. The Hydracon design is based on the use of a welded frame of high-grade aluminium-alloy extruded sections, which provides a light but strong structure which is resistant to corrosion and does not require painting. It is mounted on two wheels at the lower end, and can easily be handled and operated by two men, one at each end. The rough-faced rubber belt in the unit shown, which runs at 200 ft. per min., is 10 in. wide, but conveyors can also be supplied to suit 12, 14, 18 and 24-in. belts. Belt speeds can be reduced by altering vee-belt pulleys, the distance between the pulley centres being 15 ft. (this can be increased to 20 or 25 ft.). When rough-faced belting is used, incline angles in excess of 30 deg. may be employed, giving a take-off height of 8 ft. 6 in.

The hydraulic pump is driven by power take-off on the lorry engine or, alternatively by a small petrol-engine, and the conveyor drum is driven by hydraulic motor through v-belts and a reduction gearbox. Connection between the power unit and hydraulic motor is by rubber hose fitted with quickly detachable, self-sealing couplings which ensure no oil is lost when coupling or uncoupling.

FIG. 1.—*Loading/unloading conveyor made by Aero Controls, Limited, of Northampton. The whole unit may be carried on a vehicle.*



Dust-collector

Mancuna Engineering, Limited, Denton, Manchester, announce that they are now marketing the D.584 Mancuna-Dustex miniature cyclone dust-collector, which has been fully tested and applied in a number of medium- and large-scale plants in the USA during the last two years. It is claimed that the D.584 provides the same order of efficiency as the earlier model D.450, but in addition permits a higher gas volume per cyclone tube with a reduced pressure resistance, hence achieving considerable economies in capital and operating costs. The collector (Fig. 2) comprises a number of cyclone tubes of special design which combine to make up a cyclone tube and scroll inlet in one single casting. The tubes are cast with a $\frac{5}{16}$-in. wall-thickness, and are available in stainless-steel, aluminium alloy, or an unannealed malleable white-iron with a very hard working surface and exceptional resistance to abrasion. The cyclone tubes are located in the clean-air stream, which maintains them at system temperature and prevents condensation and subsequent tendency to build-up and blocking.

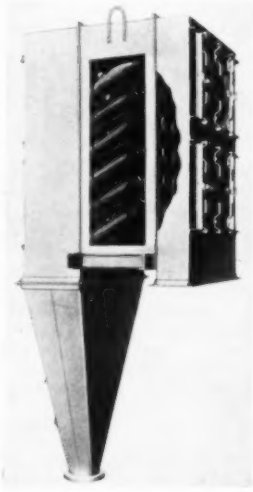


FIG. 2.—*Miniature cyclone dust-collector marketed by Mancuna Engineering, Limited, of Manchester.*

Flexible-shaft Drive

B. O. Morris, Limited, Briton Road, Coventry, have introduced a flexible-shaft machine, Morrisflex 300. The unit is a simple, multi-speed tool, and is claimed to have good manoeuvrability, rapid speed-change, constant speeds and lightness in handling. Speeds of 3,000, 9,000 or 15,000 rpm can be produced at the touch of a finger. Drives to three separate shafts are incorporated, enabling the operator to carry out successive operations without having to dismount and mount tools. Rotary files and cutters, mounted points, drum sanders, brushes, etc., can be used with this new machine. The prime mover is a $\frac{1}{4}$-h.p. motor complete with three-speed box, and the company supplies all the tools and equipment required by the operator.

Sliding-door Gear-trolley: Nylon wheels are now fitted to the No. 1 size of trolleys for sliding-door gear made by Coburn Engineers, Limited, Coburn Works, Peasmarsh, near Guildford, Surrey. It is claimed that the new trolley not only fulfills its requirements for load carrying, but the wheels wear less than the steel they replace, and the bearings need no maintenance.

Standard Specifications for Cast Iron*

Notes on the Sources of Supply of the Standard Specifications issued by the Principal British and Foreign Standardizing Organizations

By D. S. Drake

Questions about standard specifications for cast iron form the largest proportion in number of the enquiries received by the information department of the British Cast Iron Research Association. In recognition of this the Association published some years ago lists of British, US and Continental standards then current[1, 2]. Since that date the range of standards specified by members' customers has widened. For one thing, more invitations to tender are coming from foreign firms; for another, British founders are being given opportunities to tender for supplies of castings to US military bases in the UK. The last-named type of enquiry presents special difficulties to British contractors because the bases themselves do not supply any copies of the relevant specifications, and they use special military identification numbers for them. Furthermore, they often quote superseded standards because they are out of touch with standardizing bodies in the USA. In addition to requests for information arising from the circumstances outlined above, the Association is occasionally asked where firms can buy copies of standard specifications for their own works libraries. These notes have been compiled, therefore, with the object of giving members some idea of the sources of supply of the standard specifications issued by the principal British and foreign standardizing organizations.

British Standards

The principal standardizing body in the UK is, of course, the British Standards Institution. This organization issues annually a yearbook which is, in effect, a catalogue of its current standards[3]. The catalogue is kept up-to-date by monthly lists of additions, revisions and withdrawals[4]. These publications are supplied free to subscribing members of the BSI. The standards themselves can be bought, either from head office at 2, Park Street, London, W.1, or from regional sales offices at Birmingham or Bristol. In addition, full reference sets are deposited at 61 public, university and technical college libraries in the provinces and at 11 libraries in London. A list of these libraries is given in the BSI yearbook[3]. These reference sets are useful for consultation by foundries in the vicinity of the libraries when information is needed quickly. The BSI also supplies copies of certain official standards which were formerly obtainable only from the Ministry of Supply, *e.g.*, the STA series, and the K series of aircraft materials. Most DTD specifications are supplied by HM Stationery Office.

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Commonwealth Standards

Standard specifications issued by countries within the British Commonwealth of Nations can be bought through the sales department of the BSI. Information about new Commonwealth standards and draft standards is given in a quarterly publication[5]. The Standards Institution does not carry stocks of these or foreign specifications, as a rule, but acts as an ordering agency. The BSI will lend, however, copies of specifications for which there is likely to be some delay in delivery. Applications for such loans, which are limited to seven days, should be made to the librarian of the BSI in London.

US Standards

There are numerous standardizing organizations in the USA, but the following are the principal ones besides the US Federal Government: (1) the American Standards Association; (2) American Society for Testing Materials; (3) Society of Automotive Engineers; (4) US Department of Commerce (commercial standards), and (5) National Bureau of Standards. British foundrymen usually receive enquiries relating to (2) and (3), very occasionally to (1). Some of the standards issued by (1) and (3) are interchangeable with those published by (2), and the ASTM notes the equivalent numbers at the top of the first page of its own standards. Requirements for the series of special automobile cast-irons known as alloys 110, 111, 113, 114, 115, 120, 121, 122 and 123, *e.g.*, are contained in an appendix to ASTM Standard A 159-58, and ASA Standard G.25.1, grey cast-iron, is identical with ASTM A 48-56. US Federal Specifications are seldom quoted; they can be easily identified from the duplicate or triplicate letters of the alphabet preceding the number of the standard; for example, the Federal specification for malleable cast-iron is QQ-I-666c. The ASTM publishes a catalogue of all their standards every three years[6] and supplements in the intervening years, *e.g.*, the present catalogue is dated 1958 and the publication of the Supplement for 1959 has just been announced. The ASTM has also issued a convenient list of their standards relating to cast iron only[7]. A list of the standards approved by the Society of Automotive Engineers appears in the Society's handbook[8]. New US standard specifications are also noted in the BSI quarterly list[5], and the Gray Iron Founders' Society has issued a useful summary of existing standards[9]. Copies of American standard specifications can be ordered through the BSI; they can also, of course, be bought direct from the standardizing bodies concerned. The BSI keeps a file of current US

standards in its library, and these can be borrowed for seven days, with the exception of Federal Specifications which are only supplied to order.

US Military Standards

An arrangement exists between the British and US Governments by which six copies of American military standard specifications are received in exchange for British standards. One copy is sent to the Specifications Room, TIL 1B (under the Ministry of Aviation, formerly the Ministry of Supply), at Mottingham, S.E.9, which usually supplies information very promptly in reply to requests by letter or telephone. Most of these military standards have a three- or four-figure number prefixed by "AN" or "JAN," but there are abridged versions which come from the US Army Headquarters in Germany and carry the prefix "EM." The United States Government publishes a key to the military code numbers which gives the equivalent ASA, ASTM, Federal and SAE specification numbers[10].

Continental Standards

In order to keep this article a reasonable length, it is proposed to limit discussion of these to French and German standards. Both French and German standardizing bodies issue catalogues of their standards periodically[11, 12]. They can be purchased direct from Paris or Berlin, or can be ordered through BSI. Lists of new foreign standards appear in the BSI's quarterly list[5]. Since 1946 a new standardizing body has come into existence, the International Organization for Standardization, usually called the ISO with its secretariat at Geneva. The British Standards Institution issues standards on behalf of the ISO.

BCIRA Library

The BCIRA library keeps a collection, as complete as possible, of all British and foreign standard specifications, other than those of private firms, relating to cast iron. Most of these are available on loan to members. All standards are carefully indexed and cross-referenced so that enquiries, whether by letter or telephone, asking for identification of a specific grade of cast iron and information about its mechanical properties and composition, can usually be answered very promptly. Full addresses of organizations mentioned in this paper can also be supplied on request.

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[1] BCIRA *Bulletin*, 1949, **10**, 97-102, 287-293, 463-468.
[2] *Ibid.*, 1953, **12**, 75-77.
[3] British Standards Institution. *British Standard Yearbook* annually).
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[5] *BSI Oversea and Commonwealth Standards* (approximately quarterly).
[6] *ASTM* 1958 *Standards* (seven volumes). (Ferrous metals, Part 1.)
[7] *ASTM Standards on Iron Castings.* 1957, Philadelphia, ASTM. **158.**
[8] *SAE Handbook.* New York (annually).
[9] Gray Iron Founders' Society. *Summary of specifications for grey and nodular cast irons.*
[10] US Department of Defence, Standards Division. Military Handbook H. 1B; Cross-index of specifications and identification code, ferrous and non-ferrous castings. 1958.
[11] *Association Francaise de Normalization. Catalogue des Normes Francaises, Paris* (periodically).
[12] *Deutscher Normenausschuss. Normblatt-Verzeichnis.* Berlin (periodically).

Iron-ore Imports

Imports of iron ore and concentrates (except chrome iron-ore and roasted iron-pyrites) in December, and the totals for 1959 and 1958, are shown in the table below. The figures for 1959 are not completely comparable with those for the previous year.

From	Month ended Dec. 31.	Year ended December 31.	
	1959.	1958.	1959.
	Tons.	Tons.	Tons.
Sierra Leone	105,945	728,118	764,340
Canada	138,702	2,230,540	2,731,936
Other Commonwealth countries and Eire	1,850	2,404	24,697
Sweden	272,948	3,151,218	3,111,203
Norway	57,964	285,726	308,911
France	46,397	486,986	439,422
Portugal	25,726	129,718	260,584
Spain	47,559	596,295	467,861
Algeria	159,035	1,420,323	1,459,940
French West Africa	29,968	337,237	250,393
Tunisia	89,460	581,645	570,631
Morocco (excluding Tangier) ..	71,192	500,945	414,993
Liberia	31,700	285,091	364,993
Venezuela	148,400	1,393,179	1,412,899
Brazil	46,872	576,373	555,540
Other foreign countries	15,786	192,895	176,877
TOTAL	1,289,504	12,898,693	13,315,220

POLLARD BALL & ROLLER BEARING COMPANY, LIMITED—Mr. A. C. E. Marsh has joined the board.

Crane "Look-out" advocated

At an inquest at Dudley on January 25, the jury returned a verdict of "Accidental Death" on an employee of a Tipton foundry, who fell down the inside of a furnace which was being relined. The jury added a rider that, in their opinion, when two cranes were operating on the same gantry, and one crane was engaged with men, a look-out should be stationed to warn the driver of the second crane.

The court was told that Mr. John Chamberlain (63) was engaged with another operator in relining a rotary furnace on January 7. Both men were centring a former, which was held by chains from a 5-ton crane on an overhead gantry. The driver of this crane had just lifted the former about a foot when the 35-ton crane bumped into him, causing his hand on the hoist lever to jerk, and the former to lift and tip. The driver of the 35-ton crane, Mr. David James Williams, said he had picked up an empty ladle and was looking for a vacant place on the floor to lower it when he bumped into the smaller crane. "I was looking down and not along the gantry," he said. Mr. John Thomas Powell, the operator working with the deceased, said that when the collision occurred, the former tilted and trapped him against the side of the furnace. Mr. Chamberlain "went up and over the former and down the inside of the furnace."

NORTH CENTRAL WAGON & FINANCE COMPANY, LIMITED—Sir Giles Guthrie has been appointed deputy chairman. He has been a director since 1947.

American Letter

Shell-moulding in the Car Industry

At the author's company (see footnote) it is no longer debated whether or not to further expand the shell-moulding facilities. Instead, the only question is which specific shell-moulding procedure should be adopted to any particular part. Three ironfoundries and one aluminium foundry are involved; two of the ironfoundries have partially converted to shell-moulding, while the speciality aluminium foundry has shell-moulded exclusively since its origin in 1949. This foundry uses only die-casting and permanent-mould techniques.

The shell-mould process consists of using resin as a binder instead of the conventional oil or cereal binders. The mixture of sand is placed on a pre-heated pattern which cements the sand grains together to a depth of $\frac{3}{16}$ to $\frac{1}{4}$ in. This hard crust formed against the pattern is a shell. When stripped from the pattern and assembled with another similar crust, a complete shell-mould is formed. Some moulds can be poured in this state. Others require support from a relatively fluid backing-material, such as shot or sand confined by a flask. There are three basic ways to apply the sand/resin mixture to the pattern or core-box: (1) The dump-box method; (2) the strike-off method; and (3) the blow method. The dump-box method is used at the author's foundry for making crankshafts, camshafts, gear-cases, and for the valve-pot deep-draw mould components.

Strike-off and Blow Methods

The strike-off method is an excellent way to make a shallow-draw mould. A sand-resin mix is dropped on to a hot pattern, and the excess removed by a strike-off bar to produce a flat-backed shell or mould section. Two of these sections, when sub-assembled with integral dowels, form what is called a "book." Several such books are piled up vertically to form a stack-mould. Such moulds require no back-up, and are merely clamped or weighted before pouring. Valve rocker-arms are cast by this technique. With the blow method, a sand pre-coated with resin is blown into a pattern or corebox cavity. The mould or core is finish formed, and precisely dimensioned on all surfaces. Such moulds obviously lend themselves to fixturized support.

Benefits from Conversion to Shell-moulding

Experience in producing crankshafts at Dearborn Foundries has proved that many benefits have been gained from the conversion to shell-moulding, for example:

In the foundry: A wider range of pouring temperatures can be tolerated, and stress-relief heat-treatment is eliminated. Only 30 per cent. of the metal poured need be remelted, the back scrap being sand-free and needing no cleaning to prevent contamination. Shell-moulding has also permitted the use of the most advanced principles of gating and feeding, and foundry scrap has averaged only a fraction over 1 per cent., foundry machined scrap being less than 0.5 per cent. The foundry operations are now less fatiguing, less noisy and less smoky, and also cleaner, safer and healthier. Much less floor space and equipment is required, and operations have been readily automated.

In the machine-shop: The amount of finish stock removed during machining and balancing has been reduced from 9.5 lb. on a dry-sand moulded crankshaft to 5.5 lb. on the shell-moulded casting. The precise counterweight spacing eliminates entire batteries of cheeking lathes, and cheek spacings and counter-weight o.d.'s are cast with such close tolerances that running clearance in the engine is assured without prior machining. To cite a striking example, in a recent year over 1,000,000 crankshafts with calculated clearances of 0.0285 in. between one cheek o.d. and the camshaft distributor gear were assembled into engines without a single incident of interference. Tool advance has been maximized, because of less finish stock and precisely positioned diameters.

Castings now being made include: Crankshafts, gear-cases, camshafts, exhaust valves and rocker arms. Shell-moulding has not only increased the mould material cost, but also necessitated more expensive patterns and moulding machines. However, the increased productivity per man, and the reduction in secondary operations, has more than offset these increased costs, especially in view of steadily rising labour rates. Better and safer working conditions have attracted a high grade of personnel, and the more compact layout and less critical process controls have further reduced total cost.

*Abstracted from an article published in the American technical press by Mr. H. C. Grant, who is manager at Dearborn Iron and Special Foundries, Ford Motor Company, Dearborn, Mich.

Water Systems to use more Castings

The American Department of Commerce has stated that more than 800,000 tons of valves, and nearly 600,000 tons of hydrants, will be required by water and sewerage utilities between 1959 and 1975, to meet the needs of the expanding population. These totals represent an increase in casting consumption of nearly 75 per cent. compared with the 1940-58 period. The Department survey covers future requirements of iron-body bronze-mounted gate-valves and hydrants by public water and sewerage utilities, the military, and other federal systems. It is expected that more than 80,000 tons annually will be required, as compared with less than 40,000 tons in 1950. The estimates do not include valves which may be used in industrial installations.

Consolidated Zinc Contracts for Woodall-Duckham

As part of its £8,000,000 expansion programme at Cockle Creek, near Newcastle, New South Wales, Consolidated Zinc Proprietary, Limited, has awarded a number of contracts to a total value of approximately £650,000 to Woodall-Duckham (Australasia) Pty., Limited, a member of the Woodall-Duckham group of companies.

The principal item embodies the construction of the blast-furnace section and ancillary equipment for an Imperial Smelting type zinc smelter developed in the UK by Consolidated Zinc.

This plant is the result of extensive research and large-scale prototype plant tests at Avonmouth extending over many years. The process is the first to utilize the principle of a blast furnace in zinc smelting and can simultaneously produce a similar quantity of lead metal.

THE IRON AND STEEL BOARD has given its consent to an extension by Colvilles, Limited, of their original strip mill proposals which provided for 230,000 tons of sheet a year. The extension now agreed will raise the company's potential sheet production to 500,000 tons a year.

Correspondence

FOUNDRY DUST CONCENTRATIONS

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—For the past 10 years or so, the foundry industry has been paying increasing attention to the problem of dust control inside the foundry. In the past, several attempts have been made to assess quantitatively the dust concentrations at various points in the foundry, but such attempts have largely been frustrated by inherent weaknesses or experimental difficulties associated with the dust-sampling instruments which have been employed.

More recently the "Hexhlet" dust sampler has been developed by the Pneumoconiosis Research Unit at Card.ff.* This instrument, which was developed for application in coal mines, is now being produced commercially in this country and, because it possesses many advantages over all other routine dust-sampling instruments, it is being used increasingly in iron foundries for studying the nature and concentration of respirable atmospheric dusts.

One of the major advantages of the apparatus is that it is a size-selecting sampler. Dust particles greater than those of respirable size are removed from the air sample in a horizontal elutriator; those of respirable size pass through the elutriator to be caught in a paper thimble. The weight of dust in the thimble is taken as the index of "respirable" dust in the air sample.

Laboratory investigation at the Pneumoconiosis Research Unit has shown that the horizontal elutriator does reliably separate the respirable and non-respirable dust, but presumably the horizontal elutriator was unaffected by vibration when this investigation was carried out. As far as the writers are aware, no results have yet been published on the efficiency and reliability of the elutriator when the Hexhlet is used in mines.

Experience with the "Hexhlet" in iron foundries has shown that the horizontal elutriator is not always a reliable size-discriminator and that dust particles appreciably greater than respirable size may enter the thimble and cause substantial errors in the weight of "respirable" dust collected. This unsatisfactory performance of the horizontal elutriator under ironfoundry conditions has been traced to the influence of vibration, which is particularly pronounced in mechanized and semi-mechanized foundries.

Laboratory and field experiments carried out by the writers have suggested that considerable vibration of the Hexhlet can be tolerated without any adverse effect on the size-selecting efficiency of the horizontal elutriator provided that the elutriator plates are coated with a glycerine solution. Depending on the nature of the vibration, it may be possible in specific instances, to eliminate its effect at the Hexhlet by using suitable mountings, but the writers consider that the glycerine treatment of the elutriator plates has the advantage of being a simple measure of universal application.

Full details of the work carried out by the writers will be published in due course. The purpose of this letter is to draw to the attention of those using the Hexhlet to measure respirable dust concentration in iron foundries, that serious errors may be incurred because of vibration but that in the writers' experience, these can be eliminated by coating the elutriator plates with a suitable glycerine solution.

Yours etc.,

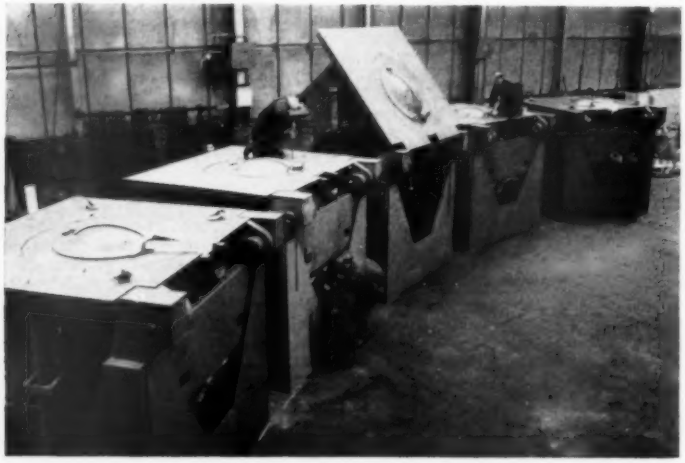
R. I. HIGGINS and P. DEWELL.

Foundry Atmospheres Section,
British Cast Iron Research Association.

* B. M. Wright: "A Size-selecting Sampler for Airborne Dust," *British Journal of Industrial Medicine*, II, p. 284 (1964).

Mr. W. D. H. GREGSON, former London manager of Ferranti, Limited, has taken up the post of assistant general manager of the company's Scottish group. Mr. Gregson, who joined Ferranti at Edinburgh in 1946, becoming technical sales manager two years later, was transferred to London in 1952.

Dr. ARNOLD GREEN, director of the British Ceramic Research Association Centre, Stoke-on-Trent, has retired after 40 years with the Association, 25 of them as director of research. He may continue to serve the Association in an advisory capacity. Dr. Green is 66.



Birlefco Furnaces for North America

Five Birlefco Wyatt melting-furnaces for shipment to North America are here shown nearing completion in the works. Each furnace will be rated at 120 kw. and will have a usable molten capacity of 27 cwt. of non-ferrous metal. It is claimed that during the last 25 years, over 700 channel-type furnaces of widely varying designs and capacities have been installed by Birlec, and Efco, throughout the world.

(Note: Seeing five of these furnaces arranged for one photograph is somewhat misleading, as their large size is not immediately apparent. Only when compared with the size of the fitters working on the furnaces, can the real dimensions of the units be gauged.—EDITOR.)

Notes from the Branches

Sheffield

A record number of over 400 members and (male) guests attended the annual banquet of the Sheffield branch of the Institute of British Foundrymen on January 25, with the branch president, Mr. J. Richardson, in the chair. The toast of "The Founding and Allied Industries of Sheffield and District" was proposed by Mr. N. P. Newman, C.B.E., J.P., president, Joint Iron Council. In his speech Mr. Newman spoke of the constant need for the co-operation between the iron and steel industries and remarked they have many things in common including the demand for heavy scrap, and whilst they were competitors in some fields, both industries would thrive in harmony. He further referred to the vigorous activities of the Sheffield branch in so much as their jubilee apprentice competition had produced 196 entries from 24 local firms. The toast was replied to by the Master Cutler, Mr. P. J. C. Bovill, J.P., who referred to the need for constant research in the iron industry and urged everyone to do all in their power to meet the constant competition which the industry meets.

Further Toasts

In proposing the toast of "The Guests," the senior vice-president of the branch, Mr. J. H. Pearce, referred to the pleasure with which all engaged in the iron industry had heard of the recent New Year honours award to Mr. Newman, and his many years' endeavour for both the industry and the IBF. Also amongst those present, said Mr. Pearce, were representatives of brother technical societies, Sheffield University and the College of Technology; also, Mr. J. H. Osborn, M.P., who was a member of the Sheffield branch Council. The non-ferrous founding industry was represented by Mr. A. J. N. Brown, president of the Association of Bronze & Brass Founders, he added. This toast was replied to by Mr. W. Barr, O.B.E., president of the Iron and Steel Institute, who referred to the importance of Sheffield industries in the fields of engineering and commerce. At the conclusion of his remarks, since the dinner was on Burns Night, Mr. Barr presented the branch president, Mr. Richardson, with a traditional haggis from north of the Border.

Slough Section

On January 19, in the Lecture Theatre, High Duty Alloys, Limited, the Slough section, under the chairmanship of the section president, Mr. S. J. Williams, heard a very interesting paper entitled "Some Special Cast Copper-base Alloys" written by Mr. A. R. French and Mr. A. W. O. Webb of J. Stone & Company (Charlton), Limited.

Mr. French who presented the paper, explained that as a paper had been given previously to the Institute of Metals on copper-base alloys in common use—in fact the alloys contained in B.S. 1,400—it was felt that the word "special" could be interpreted as being those alloys which do not appear in the B.S. 1,400. The paper had, therefore, been written to describe those alloys which were used when special properties or combination of properties were requested, such as strength, corrosion-resistance or conductivity, etc. The specific properties and requirements for which the alloys were selected, were dealt with under such headings as high strength, pressure tightness, thermal and electrical conductivity, and corrosion resistance.

Several slides were shown illustrating various types of castings, casting defects, etc., together with many graphs and tables giving the relative properties and comparisons of the various alloys. Some illustrations of castings, both large and small, gave the audience a very good insight into what it was possible to achieve with the alloys under review.

Concluding the paper, Mr. French urged everyone concerned to try and encourage designers to use standard alloys as far as possible and thus aid economy in production in the foundry.

Following the lecture an interesting discussion took place, Mr. Webb giving Mr. French very able support with the answers. A hearty vote of thanks both to Mr. French and Mr. Webb for their fine paper was proposed by Mr. Pitcher.

Lancashire

The annual dinner/dance of the Lancashire branch of the Institute, held at the Grand Hotel, Manchester, on January 23, incorporated several changes. Normally the function commences in the afternoon with a whist drive but this year this was discontinued, a cabaret

At the Sheffield IBF dinner (from left to right): the Lord Mayor of Sheffield, Alderman A. V. Wolstenholme, J.P.; Mr. G. R. Shotton, senior vice-president of the Institute; Mr. J. Richardson, president, Sheffield branch; Mr. N. P. Newman, C.B.E., J.P., president, Joint Iron Council; the Master Cutler, Mr. P. J. C. Bovill, J.P., and Mr. A. J. N. Brown, president, Association of Bronze & Brass Founders.

Group photographed at the Lancashire branch dinner (from left to right): Mr. F. W. Nield, branch senior vice-president; Miss C. J. L. Handley; Mrs. Nield; Mr. D. A. Richards, IBF junior vice-president; Mrs. Richards; Mr. C. M. G. Wallwork, branch president; Mrs. Wallwork; Mr. G. R. Shotton, IBF senior vice-president, and Mrs. Shotton.

show being included instead in the evening's proceedings. The function was presided over by Mr. C. M. G. Wallwork, the branch president and organized by the social secretary, Mr. F. W. Nield (also, senior vice-president of the branch). As is usual, the hall was filled to capacity, a total of over 260 sitting down to dinner. Fortunately, the accommodation at the Grand Hotel includes a balcony above the ballroom permitting much more room for sitting out between the dances and for watching the cabaret.

In the formal part of the proceedings, after "The Queen," Mr. G. R. Shotton proposed the toast of the branch and the president responded. "The Visitors" was proposed by Mr. Nield and Mr. B. G. Wallwork, the president's brother, replied. Homage to "The Ladies" was rendered by Mr. C. Swinglehurst who also presented Mrs. Wallwork with a gold wristlet watch from branch members as a token of appreciation of her support of the president during his year of office.

Mr. F. Lord proposed formal thanks to the branch secretary, Mr. H. Buckley, who in acknowledgment added his appreciation of the help received during the year from the Council and other prominent members of the branch. The toastmaster was Mr. F. A. Harper, and he and Mr. E. H. Beech were in charge of the subsequent proceedings, which, because it was Saturday night, finished at midnight. Not only was there an excellent cabaret, but the menu included a competition entry form and a substantial prize was awarded to the composer of the best limerick having for its first line "A Fettler was Furtively Filing the Flash . . . " Most of the entries parodied other limericks and some were scurrilous, but all were quite amusing.

In his speech from the chair, Mr. Wallwork referred jocularly to the fact that Manchester on that evening seemed to be the home of all the vices. In this, of course, he meant not evil practices but vice-presidents of the Institute, its branches, the Association of Bronze & Brass Founders, and kindred associations who were present on that occasion. It was surprising how quickly midnight arrived to terminate the proceedings, which from start to finish well reflected Lancashire camaraderie and hospitality.

Mr. G. A. HUTCHESON, M.SC., A.M.I.MECH.E., has been elected an executive director of NUMAS, the advisory service set up by the National Union of Manufacturers. Before joining NUMAS, Mr. Hutcheson held a senior appointment with Imperial Chemical Industries, Limited, advising on the application of work-study, etc. He is a member of the production advisory committee of the British Institute of Management, and has served on a number of official committees of the European Productivity Agency, the British Standards Institution and the City and Guilds of London Institute. He has also been concerned in an advisory capacity with the Department of Scientific and Industrial Research.

Mr. W. E. A. WILLIAMS, formerly the London and south-east area representative of the Suffolk Iron Foundry (1920), Limited, has been appointed sales manager and will operate from the Stowmarket head office. Two new representatives have also been appointed by the company—Mr. G. A. EDMUNDS and Mr. S. E. WITHERINGTON. Mr. Edmunds has taken over from Mr. Williams representation in London and the south-east and will work from 89, Ashbourne Road, Mitcham, Surrey; Mr. Witherington has been appointed as the Birmingham area representative and will operate from 21, Stud Lane, Birmingham, 33. Mr. E. CHRISTIE, whom Mr. Witherington replaces, has returned to headquarters at Stowmarket owing to ill-health.

Company News

Delta Metal's New Company

Formation by the Delta Metal Company, Limited, London, S.E.10, is announced of a new company, James Booth Aluminium, Limited, to acquire the whole of the aluminium and light-alloy interests of its existing subsidiary company, James Booth & Company, Limited, Birmingham. Issued capital of the new company will be £10,000,000, of which Delta Metal will contribute £5,000,000 by way of existing assets, and the Kaiser Aluminium & Chemical Corporation, of the US, £5,000,000 by way of additional finance.

The new finance will be used to expand and re-equip the company's works at Kitts Green, Birmingham, which will then become one of the most modern manufacturing plants of its kind in the country. It will be capable of producing a complete range of commercial products, as well as the more specialized lines with which the company's trade name "Duralumin" has been particularly associated in the past.

Management of James Booth Aluminium will remain in the hands of the Delta group. The board will comprise: Mr. W. E. Ogden (chairman of the Delta Metal Company), chairman; Mr. W. W. Dolton, Mr. W. J. Vaughton, Mr. A. F. Thomas, and Mr. D. H. H. Clarke (all from the Delta group); Mr. D. A. Rhoades, Mr. T. J. Ready, and Mr. A. H. Branstad (all from Kaiser Aluminium). Mr. Vaughton has been appointed managing director and Mr. Branstad assistant managing director. Sir Horace Clarke, the present chairman of James Booth & Company, has been invited to become honorary president.

Provision has been made to ensure that control of the new company will not pass out of the United Kingdom.

CYRIL ADAMS & COMPANY, LIMITED, machine-tool makers, of New Barnet (Herts)—All the company's capital has been acquired by the Staveley Coal & Iron Company, Limited, Hollingwood, near Chesterfield.

UNIVERSAL ASBESTOS MANUFACTURING COMPANY, LIMITED—The dividend is raised to 1s. 6d. (1s.) per 5s. share for the year to September 27, 1959. Group net profit expanded to £313,800 (£151,933), after tax of £219,465 (£183,304).

FLETCHER, HOUSTON & COMPANY, LIMITED, engineers and ironfounders, of Tipton (Staffs)—Arrangements have been entered into for the purchase of a private company in the Midlands carrying on a substantial and old-established business. The price is approximately £420,000 cash.

PERMUTIT COMPANY, LIMITED, manufacturers of water-treatment plant, etc., of London, W.4—The directors regard the provisional figures for 1959, subject to audit, as satisfactory and have decided to start interim dividend payments with a declaration of 7½ per cent. The single dividend for 1958 was 15 per cent.

ENGLISH CHINA CLAYS, LIMITED—Group profits increased to £3,284,294 (£2,538,182) for the year to September 30, 1959, and following the higher 2½ (2) per cent., tax free, interim, the final dividend is raised by 1 per cent. to 6½ per cent., tax free. A proposed one-for-five scrip issue to holders of the £5,709,982 ordinary capital is also announced.

SHANKS & COMPANY, LIMITED, sanitary engineers and ironfounders, of Glasgow—The final dividend is increased by 2½ per cent. to 10 per cent., making 12½ per cent. for 1959, against 10 per cent. Profits have risen from £90,064 to £120,105 after tax of £92,898 (£81,663) and bringing in £10,000 (same) from staff pension reserve to meet cost of past service pensions.

JOHN FOWLER & COMPANY (LEEDS), LIMITED, manufacturers of tractors and locomotives—There is a dividend of 15 per cent. for the year to September 30, 1959. No dividend was paid for the previous year. Net profits were £53,171 (loss, £16,064) after tax £8,236 (nil) and depreciation £38,054 (£44,580). The company is a subsidiary of Marshall Sons & Company, Limited.

NEWMAN, HENDER & COMPANY, LIMITED, iron and non-ferrous founders, etc., of Stroud (Glos)—A rights issue is to be made of 753,239 10s. ordinary shares at 22s. 6d. each on a one-for-three basis. The issue will provide not only for the acquisition of Sydney Smith & Sons (Nottingham), Limited, but also working capital and further requirements for the development of the Canadian subsidiary.

DAVID ROWAN & COMPANY, LIMITED, marine engineers and boilermakers, of Glasgow—The company has acquired the whole of the issued share capital of the marine engineering firm of Rankin & Blackmore, Limited, Greenock. Both companies are members of the Lithgow group. Mr. James Ferrier has resigned from the board of Rankin & Blackmore (which will continue as a separate business), but remains a director of other companies in the group.

BRITISH OXYGEN COMPANY, LIMITED—The directors attribute the increased profits to widespread expansion and improvement in operations overseas and important contracts at home undertaken by the engineering division. Group profits for the year ended September 30, 1959, were £12,926,867 (£11,319,153), tax took £4,065,754 (£3,890,438), and net profit is £4,521,390 (£3,334,062). The dividend is effectively raised to 14 (12) per cent. with a final of 10 per cent.

BTR INDUSTRIES, LIMITED—Group profits have dropped from £749,394 to £579,135 for the year to September 30, 1959. A final dividend of 10 per cent. is announced, which reduces the total ordinary dividend by 2½ per cent. to 12½ per cent. Net profits were £328,953, compared with £348,120. This was after a much lower tax charge of £250,182 (£401,274). The directors state that although adverse trading conditions continued for the greater part of the period, there was improvement towards the end of the calendar year. The outlook is encouraging.

C. & J. HAMPTON, LIMITED, ironfounders and makers of engineers' and woodworkers' tools, of Sheffield—The improvement which was becoming apparent last August is continuing, but difficulties remain in certain export markets affected by quotas and licences. A rise in manufacturing costs would seem inevitable following present wage negotiations in the engineering industry. On balance the board views the immediate future with confidence, states the chairman, Mr. A. B. Hampton, but reminds holders that the proposed one-for-two scrip issue does not imply an increase in the future distribution.

H. M. HOBSON, LIMITED, manufacturers of aircraft engine components, of Wolverhampton—Although new orders arising from the requirements of defence aircraft have been affected, the directors report that due to the policy of providing highly-specialized plant, equipment, and technical ability, the order-book has been maintained at a satisfactory level, both in the military and civil fields. New products are being developed and the directors have confidence in the future of the company. The dividend for the year ended September 30, 1959, is being effectively raised to 15 (12½) per cent. and the consolidated net profit is £364,289 (£379,168).

Personal

Mr. D. J. CLARKSON and Mr. R. J. WELSH have resigned their directorships of Glacier Metals, Limited.

Mr. JOSEPH GREATOREX has been appointed chief inspector of Sintered Products, Limited, Sutton-in-Ashfield, Notts.

Mr. G. L. KNIGHT has been appointed assistant to the director of the Scientific Instrument Manufacturers' Association of Great Britain.

Mr. S. H. IRELAND, B.COM., B.SC., has been appointed assistant managing director of the Consolidated Pneumatic Tool Company, Limited, London, S.W.6.

Mr. REGINALD MAUDLING, president of the Board of Trade, is to be the chief guest at the Coventry Chamber of Commerce annual banquet on March 3.

Mr. J. B. SCOTT has been appointed overseas sales director of Crompton Parkinson, Limited, and will be responsible for the overseas division, following the recent reorganization of the sales divisions of the company.

Mr. R. E. F. SYKES, associate member of the Institution of Works Managers, has been appointed general manager of Griffin & George (Laboratory Construction), Limited, of Perry Barr, Birmingham, and Mitcham, Surrey.

Mr. DENIS F. DODD and Mr. RICHARD H. HIGGS, have been appointed directors of the British Rollmakers Corporation, Limited, following the acquisition by that company of the whole of the issued share capital of Richard Lloyd, Limited.

Mr. J. A. GODDARD, director and secretary of Fry's Diecastings, Limited, has been elected chairman of the Zinc Alloy Die Casters' Association for 1960. He succeeds Mr. K. J. WHITEHEAD, joint managing director of Wolverhampton Die Casting Company, Limited.

Colonel C. R. HODGSON, director of C. and J. Hampton, Limited, toolmakers, Sheffield, is on a business tour of India, Thailand and Australia. He expects to be back in Sheffield in April. Colonel Hodgson is a former president of the Sheffield Chamber of Commerce.

Mr. F. J. EVEREST, Mr. J. T. RILEY and Mr. K. L. OLIVER have been appointed directors of David Brown Industries, Limited, Huddersfield. Mr Everest is general manager of the industrial gear division; Mr. Riley general manager of the automobile gear division and gearbox divisions; Mr. Oliver is general manager of the machine-tool and tool divisions.

Mr. F. ARNOLD WILSON has been appointed in a part-time capacity as adviser to Baker Perkins' foundry machinery department which is part of the firm's Bedewell division at Hebburn-on-Tyne. Mr. Wilson who is 65, retired last autumn after 40 years with William Jacks & Company, Limited, where he had managed the home pig-iron department.

Mr. F. W. TOMLINSON, managing director of Pyrotenax, Limited, Mr. J. M. WILLEY, director and general manager of Murex Welding Processes, Limited, and Mr. P. S. BRYANT of Murex, Limited, have been appointed to the board of Murex, Limited, Rainham. Mr. Tomlinson has also been appointed to the board of Murex Welding Processes Limited, Waltham Cross.

Mr. W. I. FRENCH has been elected deputy chairman of Sir William Arrol & Company, Limited, Glasgow. Mr. ALFRED DAVIS, formerly special director at the Crane Works, Parkhead, has been appointed a director, to be in full charge of the Crane Works, and Mr. W. RESIDE will continue as a special director at the same works and has also been appointed chief engineer there.

Mr. CHRISTOPHER STEPHENSON, a former director and general manager of the Hebburn shipyard of R. & W. Hawthorn Leslie & Company, Limited, has joined the board of two Sunderland shipbuilding companies, Joseph L. Thompson & Sons, Limited, and Sir James Laing & Sons, Limited. Mr. H. J. ADAMS, naval architect, and Mr. G. HARFORTH, have been appointed to the board of Sir James Laing.

A "smoker" evening was held at the North Riding Hotel, Middlesbrough, Yorks, to mark the retirement of two long-serving members of the Anderston Foundry Company, Limited, near Middlesbrough. Mr. PETER CONNORS, who has completed 48 years' service and Mr. RICHARD ALLEN, 41 years' service, each received a wallet of notes on behalf of the welfare fund from Mr. F. Tubby, the works manager.

Mr. J. J. PARKES and Mr. ARTHUR CHAMBERLAIN have joined the board of Guy Motors, Limited. Mr. Parkes is chairman and managing director of Alvis, Limited, and a director of the Cornhill Assurance, Limited, and the Society of British Aircraft Constructors, Limited. Mr. Chamberlain is a director of J. Brockhouse & Company, Limited, British Railways (Western Region) and Lloyds Bank, Limited, Midland board.

Mr. GEORGE BIRCH, chairman and managing director of the Standard Piston Ring and Engineering Company, Limited, Don Road, Sheffield, retired from active control of the firm at the end of last month. Mr. Birch who is now 84, joined the company as works manager in 1900. He became chairman in 1951, and he will continue in that capacity and also act as consultant when his services are required.

Mr. VINCENT JOBSON, chairman and managing director of Qualcast, Limited, Derby, presented nine long-service employees with clocks at the annual social of the die-casting, and steel divisions and engineering section at the King's Hall, Derby, on January 22. As it happened to be Mr. Jobson's 73rd birthday he received musical greetings from the band, and 500 employees sang "Happy Birthday to You." Mr. Jobson told the company that he had no intention of retiring, and referred to the new £250,000 automatic moulding plant which would soon be running at full efficiency.

The first woman to be awarded the Diploma in Technology is 24-year-old Miss SHIRLEY P. WALLIS, who is a research worker in the radio department of the Royal Aircraft Establishment, Farnborough. Miss Wallis was educated at Dartford Grammar School where she gained her G.C.E. advanced level in pure mathematics, applied mathematics and physics. Joining the Ministry of Supply in November 1954, she was selected for a Ministry of Supply grant for the first applied physics sandwich course at the Northampton College of Advanced Technology, where she started in January, 1956.

Foundry Equipment, Limited, announces the following changes effective from January 1 this year:— Mr. J. C. HOWARD, previously director, is now deputy managing director; Mr. H. J. THOMPSON, previously sales manager and deputy director, has been made sales director, and Mr. J. A. BARRETT, managing director of Conveyor & Shotblast, Limited (an associate company), continues in this office but is now also director of Foundry Equipment, Limited. Cleanair, Limited, an associated company, announce that Mr. L. J. LAWRENCE, general manager and Mr. B. A. PAGE, secretary, have been appointed to the board of the company.

News in Brief

ALLIED IRONFOUNDERS, LIMITED, announce that the address of their bath sales division is now 28, Brook Street, London, W.1. The director of the division is Mr. F. Maurice Jones.

THE DUTCH FIRM of N. V. De Nederlandsche Gasmeterfabriek George Wilson, of The Hague, has obtained from the Argentine an order for the supply of 30,000 aluminium gas-meters.

ON January 30, the Bristol branch office of Brook Motors, Limited, moved to larger premises in the Refuge Assurance Building, 18, Baldwin Street, Bristol 1. (Telephone number unchanged).

WILLIAM BEARDMORE AND COMPANY, LIMITED, a subsidiary of Thos. Firth and John Brown, Limited, Sheffield, are to modernize the roll heat-treatment plant. The melting shop casting bay is also being reorganized.

AN AGREEMENT HAS BEEN REACHED between Vecor (Vanderbijl Engineering Corporation, Limited) Vanderbijlpark, South Africa, and Rubery, Owen & Company, Limited, Darlaston, Staffs, to manufacture motor-vehicle component parts in South Africa.

THE SECRETARY, Mr. R. J. Bown, of the Slough section of the Institute of British Foundrymen reports that April 30 has now been chosen as the date for the section's annual social event. Details will be announced shortly, meanwhile members are asked to keep the date open.

THE MANAGEMENT AND STAFF of the Metropolitan regional office of United Dominions Trust, Limited, hitherto accommodated at United Dominions House in the City, moved on February 1 to a newly-constructed office building at 199/201, Marylebone Road, London, N.W.1.

HALIFAX CORPORATION DEVELOPMENT COMMITTEE has agreed to a proposal to sell to Hartley & Sugden, Limited, Halifax, 1,700 sq. yd. of land, forming part of the fairground at Victoria Road, which adjoins the works of the company. The agreement is subject to the Town Clerk being satisfied as to the Corporation's power to dispose of the land.

THE IRON AND STEEL INSTITUTE is starting an abstract and book-title index-card service which will consist of index cards containing the abstracts and new book titles as published in the Institute's *Journal*, classified by the universal decimal system of classification. These cards will be sent out to subscribers fortnightly and the service will begin with the material published in January.

LONG-SERVICE AWARDS for completion of 25 years service were presented to 32 employees of Monsanto Chemicals, Limited, at a dinner held at the Ruabon factory, North Wales, on Thursday last. Of the 200 or more long-service employees present, 31 had been with the company for more than 40 years. The presentations were made by Sir Miles Thomas, chairman of the company.

A 20-FT. SKELETON of a plesiosaurus has been found in an iron-ore mine at Nettleton, near Caistor, Lincolnshire. It is being removed piece by piece by Mr. David Spalding, of Scunthorpe Museum, who hopes to reconstruct it. The plesiosaurus is a pre-historic whale-like creature, and the discovery of the skeleton 20 miles from the sea is explained by the fact that Lincolnshire was once completely covered by the sea.

AN ORDER WORTH £500,000 for coke-oven machinery and mechanical-handling plant, has been received by the Aberdeen firm of John M. Henderson & Company, Limited, engineers, from Richard Thomas & Baldwins, Limited, Newport. The order which was gained in the face of strong competition, will not only provide employment for the company's 600 employees for a year but will also entail the engagement of extra staff.

THE OWEN ORGANIZATION announces that one of its member firms, A. G. Sutherland, Limited, has taken over J. B. Williams (Maxstoke), Limited, and H. T. Developments, Limited. These companies will continue to trade under their own identity and will operate as subsidiaries of A. G. Sutherland, Limited. The directors of the three companies are:—Mr. B. E. Mace (chairman); Mr. A. G. B. Owen, and Mr. W. Lawson Hurdman.

FLOOD WATER which seeped into the foundry of Shotton Bros., Limited, Lodgefield Road, Halesowen, halted work there for nearly two hours last weekend. Firemen, using a pump, drained between 15,000 to 18,000 gall. of water from the catchment pits where a conveyor belt is housed. Thawing snow had soaked through the shale foundations around the building causing flooding of the motor-house. Work was resumed after the firemen left.

"WHITHER INDUSTRIAL RELATIONS" is to be the theme of the week-end conference which the Wolverhampton and Black Country branch of the Institute of Personnel Management is organizing at Ashorne Hill, Leamington, from May 7 to 8. The chairman of the conference will be Mr. Henry Allen, industrial relations manager of the Yale & Towne Manufacturing Company, and the speakers will include Mr. Peter Thomas, Parliamentary Secretary to the Ministry of Labour.

THE HUNGARIAN MINISTER IN LONDON, Mr. Béla Szilágyi, last Thursday presented the Shell Film Unit with three awards gained in an international festival of scientific and technical films held in Budapest last October. The *Grand Prix* for the best popular scientific film on mechanical engineering went to "The Forming of Metals," whose director, Mr. Peter de Normanville, received the prize on behalf of the Unit. This film also won the second prize in the mechanical engineering group.

KEIGHLEY LIFTS, LIMITED, are opening new premises after alterations at the Dryart Mills recently acquired by them, and which will be known as the Dryart Works. The factory roof has been raised 10 ft. so that mechanical cranes for handling the larger parts of lift installations could be fitted throughout the assembly shop. £100,000 has been spent on the conversion over the last 18 months. The firm is continuing to operate at the Dalton Lane works, 200 yards away; the new factory allowing for expansion.

CONSENT TO A REVISED PROPOSAL by the Steel Company of Wales, Limited, for its "fourth development plan," which will increase the steelmaking capacity of the Abbey Works at Port Talbot from 3,000,000 to 3,600,000 ingot tons per annum and the company's production of sheet and tinplate by 400,000 tons per annum was given by the Iron and Steel Board at its meeting on January 26. In response to a request from the board, the company has decided to exclude from its present plan the hot strip mill.

IN THE JANUARY 21 ISSUE of the JOURNAL it was announced that Mr. James A. Folger had been elected to the board of Caterpillar Tractor Company, Limited. This was in fact incorrect and should have read "elected to the board of Caterpillar Tractor Company, of Peoria, Illinois, U.S.A." It should be noted that the designation of Caterpillar in the United Kingdom is

Caterpillar Tractor Company, Limited, which is a subsidiary of, and wholly owned by its American parent, Caterpillar Tractor Company.

SKLENAR FURNACES, LIMITED, 385, Newport Road, Cardiff, announce that they have taken space at the American Foundrymen's Society Exhibition which is to be held in Philadelphia from May 9 to May 13. A range of Revecon and Reverbale furnaces will be demonstrated on the stand which is being manned by staff from Cardiff as well as by the company's American agents. A number of both types of furnace are already in operation in the USA and Canada, and several new features will be exhibited at this Exhibition.

CONTINUOUS CASTING COMPANY, LIMITED, of Weybridge, Surrey, announces an agreement for technical collaboration with Low Moor Alloy Steelworks, Limited, of Bradford. The latter company has, over a number of years, developed in its own works the continuous casting of stainless and alloy-steel slabs, blooms and billets. The Continuous Casting Company, Limited, which is associated with Davy & United Engineering Company, Limited, and Newton Chambers & Company, Limited, is a licensee for the BISRA processes of continuous casting.

A BRONZE PLAQUE showing the head and shoulders of Sir Ernest Canning, president of W. Canning & Company, Limited, Birmingham, was unveiled at a ceremony at the works on January 25. Sir Ernest was present at the ceremony. Mr. F. H. Ewens, managing director, who unveiled the plaque, said that when, a year ago, Sir Ernest retired from active participation in the affairs of the company, the firm, to mark his 66 years' association with it, established two scholarships at Birmingham University, one in the Department of Industrial Metallurgy, the other in the Department of Chemistry. The plaque, which is to remain in the entrance hall of the company's head offices, would stand as a permanent record of his life's work to future generations.

FOUNDRY EXHIBITS will be prominent at the "Gas at Work in Industry" exhibition, sponsored by the Eastern, North Thames, South Eastern and Southern Gas Boards, and open from March 1 to 12. Among these, F. & M. Supplies, Limited, will be staging a demonstration of cores being baked, using a rapid-baking oil as the corebinder. This display will be arranged in conjunction with a continuous coreoven made by Radiant-Heating, Limited. The exhibition, which is being held in the Royal Horticultural Hall, Vincent Square, London, S.W.1, will be open from 10 a.m. to 6 p.m. each weekday. The general theme of the exhibition will be interpreted by a number of demonstrations—similar to that referred to earlier—of modern techniques applied on a production scale.

THE DAVID BROWN TRACTOR DIVISION of Huddersfield, part of the David Brown Corporation, Limited, have announced the signing of a substantial contract with the Oliver Corporation of Chicago for the supply of British-built tractors for the United States, Canada and South America. It is reported that this is the first time that a major American manufacturer has approached a British company in this way. A statement issued by David Brown's states that this Anglo/American deal confirms Britain's current domination in world tractor markets, recent figures showing that British tractor exports outnumber those of all other tractor-manufacturing countries combined. The Oliver Corporation is to market the British tractors in North and South America as an addition to their own range of tractors.

SPEAKING AT the annual dinner of the Sheffield and district branch of the Institute of British Foundrymen at the Royal Victoria Hotel, Sheffield, last week, Mr. P. J. C. Bovill, the Master Cutler, said that the iron industry was "menaced by all kinds of competition." Although immediate prospects for both steel and iron were bright, there were clouds on the horizon in the iron industry. The drop in revenue of the British Cast Iron Association was "alarming," he said, and added that there was a vital need for research in iron. Because ironfounding had been going on for two-and-a-half centuries, it was assumed that it would continue to do so, said Mr. Bovill, but there was the menace of all sorts of competition, including fabrication and the use of aluminium for automobile components. There was no longer complete dependence on craftsmen; the emphasis had shifted to engineers who could reduce production costs.

THE EXPORT CREDITS GUARANTEE DEPARTMENT reports that business insured in 1959 under its "commercial" policies was another record: declarations of shipments, at £638,200,000, were over 20 per cent. above the previous record of £520,600,000 in 1958 and showed an increase of over 30 per cent. on the figure (£485,400,000) for 1957. The percentage of United Kingdom exports covered (under both "commercial" and "national interest" insurance) continues to rise and was 18.3 per cent. during 1959 compared with 15.5 per cent. in 1958 and 14.0 per cent. in 1957. During the last quarter of the year, 18.8 per cent. of United Kingdom exports were insured. The number of short-term policies current (covering shipments of goods sold on up to three years' credit) rose during the year from 4,465 to 4,852 and the face value from £597,200,000 to £643,900,000. New medium-term business (involving credit terms up to five years from date of shipment) transacted during the year amounted to £86,700,000. This was a slight increase on 1958 (£75,800,000) but was below the record £156,600,000 in 1957.

Obituary

Mr. R. WATERHOUSE, advertising and publicity manager of the motor-car division of Rolls-Royce, Limited, has died as the result of a motor accident. He was 39.

Mr. FREDERICK CAVENDISH ISHERWOOD, founder of Hargreaves & Jennings, Limited, ironfounders, Tottington, Bury (Lancs), has died at the age of 78. He was a director of the firm from 1920 until he retired in 1945.

The death has occurred, at the age of 55, of Mr. JAMES BUCKLEY, M.B.E., manager and a director of Thomas Robinson & Son, Limited, woodworking and flour-milling machinery makers, of Rochdale. He started work with the firm at the age of 14, became assistant works manager in 1938 and works manager in 1948. He was appointed a director in 1951. The M.B.E. was conferred on him in 1953 for services to industry.

LANDMASTER, LIMITED—Mr. A. Booth, general manager, Mr. F. Bedworth, home sales director, Mr. E. W. Lee, technical director, Mr. H. T. Jones, works director, and Mr. R. Wijewardene, director, South East Asia, all of whom have served as executive directors for some years, have been appointed to the main board of the company, which is a member of the Firth Cleveland, Limited, group.

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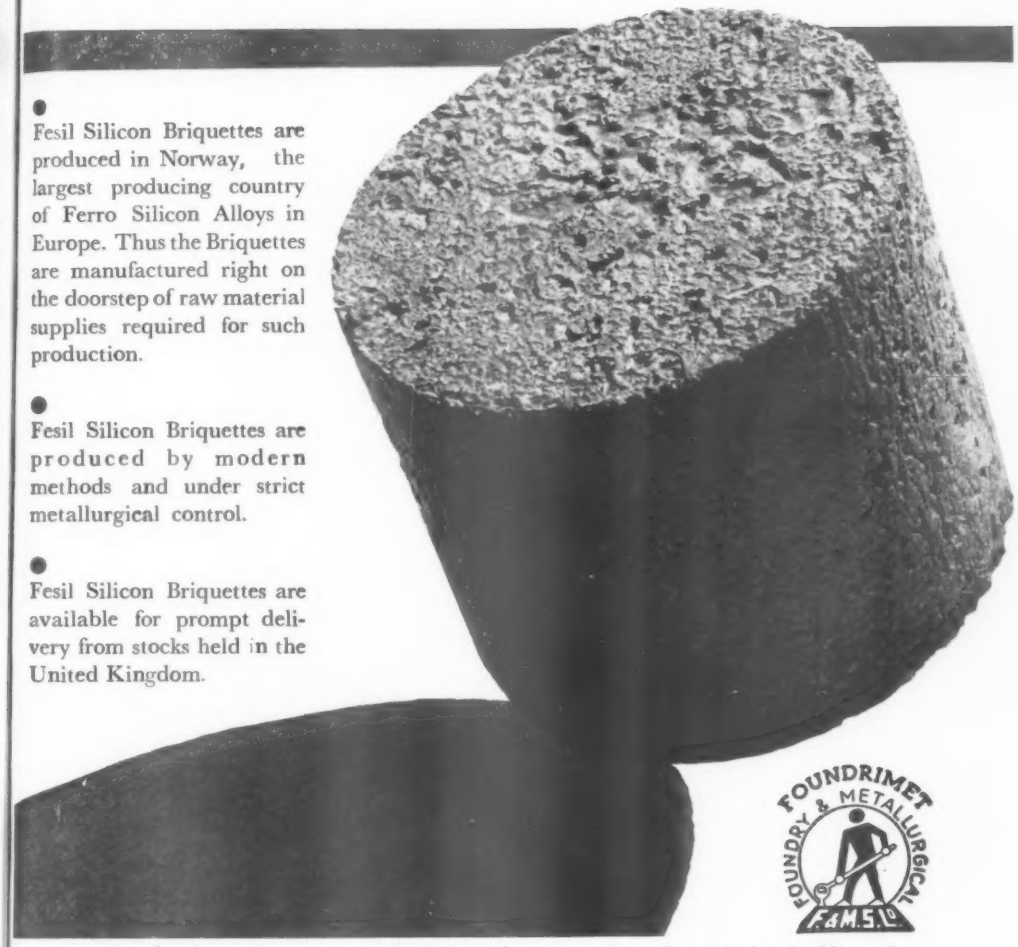

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Raw Material Markets

Iron and Steel

The increased demands for pig-iron were reflected in the latest output figures. Increased tonnages of pig-iron are being utilized by both the steelworks and the foundries. With outputs of ingot steel now being obtained at over 90 per cent. of productive capacity, larger tonnages of basic pig-iron are being called for by the steelworks and the probable scarcity of suitable scrap may also necessitate the usage of further increased quantities of pig-iron. Producers are able to cope satisfactorily with the demands now being made upon them for consumption and stock requirements and additional furnace capacity is available to provide increased supplies if required.

Of the foundry grades of pig-iron, there continues a heavy demand for the low-phosphorus irons, outputs of which are now on a much-increased scale from the several sources of supply now available. The supply of some brands remains limited, but overall production appears adequate for current needs. Hematite producers are much busier because of the increased demands from the steelworks and the foundries, whose requirements have reduced appreciably the stocks previously on hand at the furnaces and are also absorbing the major portion of current outputs. High-phosphorus pig-iron is the most easily obtainable, although demands from the foundries using this grade are maintained at the improved levels and, with the tonnages the furnaces are able to dispose of to buyers overseas, their present supply position is on a much better scale than formerly. Refined iron makers are also fairly well committed for their outputs.

The call for castings follows closely to the same pattern. For high-duty castings substantial demands continue to be made and most of the engineering and speciality foundries are busy. The foundries supplying castings to the motor vehicle trade have heavy commitments and are assured of a continuance of business at least at present levels for some time ahead. The orders being placed by many other trades for high-duty castings provide the foundries catering for them with sufficient work to enable them to obtain satisfactory outputs, but from collieries and railways demands are only very moderate. Many of the light foundries continue to benefit by the improved call for castings from the makers of domestic and heating appliances and also for builders' castings. The textile foundries show some improvement, but could undertake more work.

There is a heavy demand from the foundries for scrap, particularly for heavy cast iron and machinery scrap, arisings of which are below requirements. Foundry coke is coming forward satisfactorily. Ganister, limestone, and firebricks are available to requirements.

The re-rollers continue to be well employed and demands for all their products are maintained at recent high levels, particularly for small bars, light sections, and reinforcing rods. Pressure on home steelworks for supplies of steel semis is maintained and present deliveries for consumption and stock are below requirements. Most of the steelworks are committed for their outputs for some months ahead, and any fresh business accepted is for deferred delivery.

Non-ferrous Metals

The settlement announced last week between Kennecott Copper Corporation and the three local craft unions at its Utah division frees up this big copper producer completely from the strike. Kennecotts' Utah division was the only part of its operations still strikebound and the return of 6,500 men, who, in a normal year, produce some 170,000 tons of copper was the signal for a sharp reaction in London. Indeed, the cash and the settlement price finished last week some £10 a ton below their best level of around £272. Further ground has been lost this week.

It is now believed that negotiations with the two remaining strikebound producers, Anaconda and Phelps Dodge, will begin afresh and that a complete settlement of all outstanding difficulties will be effected in a short time. It is a little difficult to know whether the sharp drop in London is only taking the Kennecott settlement into account or whether on receipt of the news that a complete settlement has been agreed, the price structure will weaken further. In any event, the London quotations must necessarily be sensitive in the days ahead pending an overall truce and a reappraisal of the production/consumption picture in America when the whole industry is once more working at full capacity.

Stocks in London are low and demand is good so that any sharp decline in prices may well be overdone and will call for readjustment.

Tin is not as steady as one could wish in London and in New York. Yet the market is firm in the East and the outlook, even with the increased export quota, is good. M. Peter, chairman of the International Tin Council, announced that at the end of September the buffer stock held 11,150 tons. This figure is thought to be high by many dealers, who offer the explanation that the buffer stock manager, of whom it is known has been selling substantial quantities in the last quarter of the year, may well have been buying equivalent quantities for stock from the East. In the United States the price is over $1.00 a pound.

Lead is a good market in London and price has recovered its earlier losses quicker than many had anticipated. Trading activity remains at a high level and the price is hovering around £74 a ton. In the US activity is improving and the quotation is unchanged at 12 cents a pound.

Zinc is a good market in London and in New York, although somewhat irregular. This is thought to be due to the International Lead and Zinc Group Study meeting in Geneva at which the opportunity may well be taken by member countries to announce their future production plans. Rumour has it that the present restrictions on the export of zinc may be removed and those on lead abolished in the middle of the year. In London demand is good, although the belief that supplies will become increasingly easier has kept price changes down to a minimum. The US price is unchanged at 13 cents a pound.

Scottish Industries Exhibition

The Scottish Industries Exhibition, 1959—Scotland's greatest-ever shop window—was worthwhile, according to 91 per cent. of the exhibitors. Of the others, half did not find it worth while and half weren't sure about it. This was the verdict given in Glasgow by Sir Robert Maclean, chairman of the council of management of the Exhibition. He said the Exhibition showed a surplus of between £10,000 and £12,500—"a happy outcome which relieved the guarantors of any possible call." Exhibitors had been asked to make a return of orders and inquiries, but for the most part they considered this information private. However, he could report that business exceeded that of 1954, when orders and inquiries of over £10,000,000 were recorded. Approximately 37,000 trade buyers visited the Exhibition.

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The photograph below shows one of eight matched Baker Perkins units chosen to provide all the mixing requirements for an automotive grey iron foundry in the U.S.A. A strong line of five B-P (150 tons per hour) 5A Continuous Moulding Sand Mullers delivers consistently uniform sand into the moulding shop.
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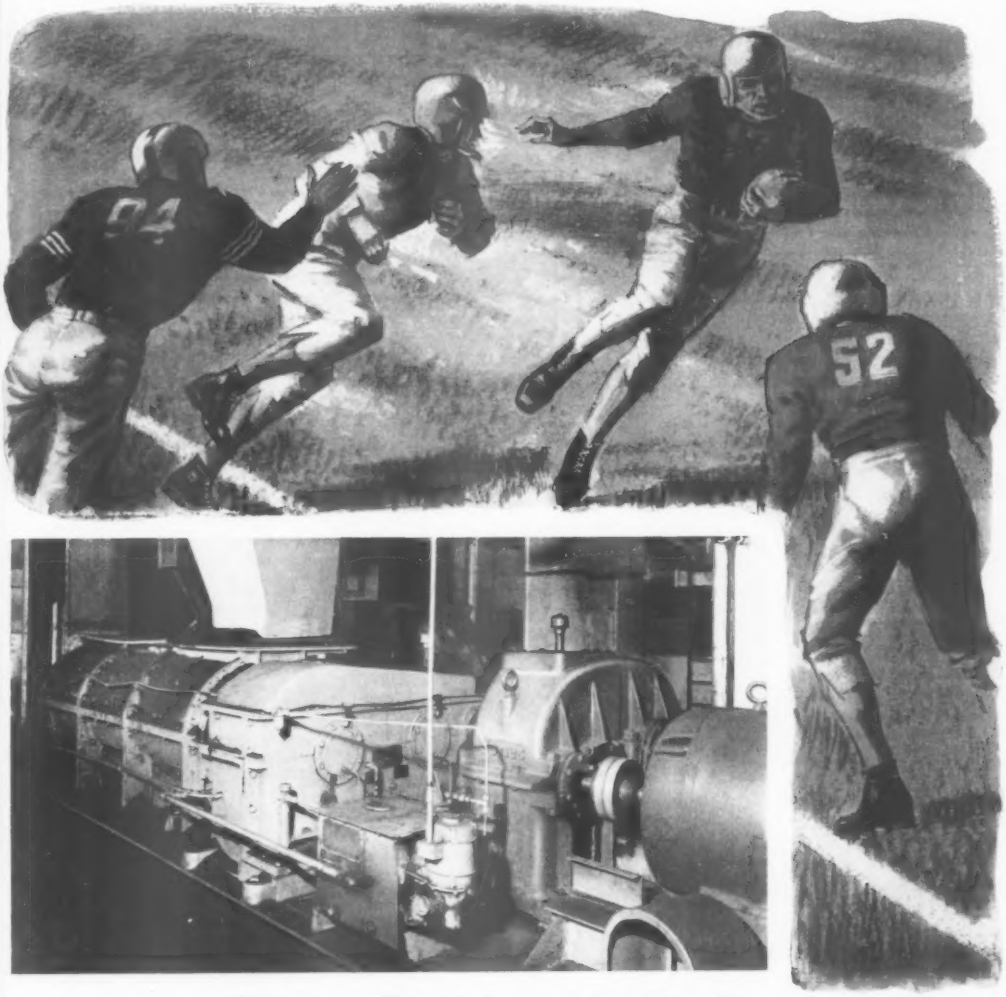

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BPF9

Pig-iron and Steel Production

Statistical Summary of November Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in November. Table 3, weekly average production of finished steel in October. Table 4 gives the production of pig-iron and ferro-alloys in November, and furnaces in blast. (All figures are weekly averages in thousands of tons).

TABLE 1.—*Iron and Steel Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials						Imports.[1]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[2]
1957	328	488	537	325	303	270	275	220	14	417	322	1,444
1958	343	403	478	276	262	227	245	196	9	369	284	1,542
1959—Sept. ..	338	486	485	288	259	212	251	231	7	426	318	1,467
Oct. ..	339	504	480	299	283	228	270	235	7	441	336	1,445
Nov. ..	339	504	483	299	291	234	277	247	9	459	—	1,410

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in November*, 1959.

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbys., Leics., Notts., Northants., Essex ..	—	4.9	15.2 (basic)	2.7	0.1	21.3	1.6	22.9
Lancs. (excl. N.W. Coast), Denbighs., Flints., Ches.	1.4	33.9	—	5.0	0.3	39.2	1.4	40.6
Yorks. (excl. N.E. Coast and Sheffield)								
Lincs.	—	48.9	—	—	0.1	48.9	0.1	49.0
North-East Coast	0.9	86.6	—	1.5	0.4	87.6	1.8	89.4
Scotland	1.4	46.1	—	2.9	—	48.5	1.9	50.4
Staffs., Shrops., Worcs., Warwicks	—	24.5	—	4.2	0.8	27.7	1.8	29.5
S. Wales and Monmouthshire	2.1	94.4	12.9 (basic)	0.9	0.1	110.0	0.4	110.4
Sheffield (incl small tonnage in Manchester) ..	8.2	37.8	—	14.0	0.3	58.4	1.9	60.3
North-West Coast	0.1	—	5.2 (acid)	0.8	—	6.0	0.1	6.1
Total	13.6	376.9	33.3	23.7	0.1	447.6	11.0	458.6
October, 1959	14.3	362.3	30.7	32.0	2.1	430.7	10.7	441.4
November, 1958	12.2	293.4	23.4	20.9	2.0	342.1	9.8	351.9

TABLE 3.—*Deliveries of New Non-alloy and Alloy Finished Steel*

Product.	1957.	1958.	1958.	1959.	
			Oct.[3]	Sept.[3]	Oct.
Non-alloy steel:					
Ingots, blooms, billets and slabs[4]	5.0	4.6	3.2	5.7	4.9
Heavy rails ..	11.2	10.2	10.5	6.8	6.4
Sleepers	1.3	1.2	1.0	0.5	0.3
Fish and soleplates	0.8	0.7	0.7	0.4	0.5
Plates:					
(i) Over ¼in. thic	34.0	29.6	26.7	26.6	29.3
(ii) Under ¼ in.	20.3	17.7	16.8	19 0	20.3
Other heavy prod.	53.0	41.8	34.8	48 0	51.5
Ferro-concrete bars	8.9	7.6	6.9	12.9	11.7
Wire rod	23.3	21.5	24.3	24.7	27.9
Arches, etc. .	11.0	8.6	7.9	7.8	7.6
Other light sections	38.7	29.1	29.1	36.9	39.5
Bright steel bars ..	7.0	6.2	6.2	8.3	9.1
Hot-rolled strip ..	23.1	22.6	23.6	30.1	31.3
Cold-rolled strip .	7.1	7.0	7.1	9.2	9.7
Sheets, incl. coated					
(i) Hot-rolled ..	13.0	10.6	10.5	14.1	13.8
(ii) Cold-reduced	29.1	31.1	32.3	37 5	39.4
Tinplate:	12 8	18.7	21.6	23.7	21.3
Blackplate ..	1.0	0.8	0.8	0 9	0.8
Tubes up to 16 in.	22.1	19.0	18.4	22.5	25.4
Tube fittings, etc.	0.5	0.4	0.4	0.4	0 5
Tyres, wheels, axles	5.1	4.5	4.2	1.8	2.0
Forgings (excl. drop)	3.1	2.6	2.3	2.0	2.2
Steel castings ..	4.6	4.2	3.8	3.7	3.8
Tool steel, etc. ..	0.3	0.2	0.2	0.2	0.5
Total	342.3	300.5	293.3	343.7	359.7
Alloy Steel	17.8	16.1	13.6	18.5	21.7
UK production[5] ..	360.1	316.6	306.9	362.2	381.4
Add: Imported finished steel ..	9.6	7.1	3.5	6.1	7.8
	369.7	323.7	310.4	368.3	389.2
Deduct: Intra-industry conversion[6] ..	48.2	41.2	42.3	51.7	54.4
Total new material ..	321.5	282.5	268.1	316.6	334.8

TABLE 4.—*Production of Pig-iron and Ferro-alloys*

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbys., Leics., Notts., Northants, and Essex	18	1.4	22.1	21.4	0.7	—	45.6
Lancs. (excl. N.W. Coast), Denbigh. Flints., and Ches.	5	—	15.5	—	—	1.1	16.6
Yorks. (excl. N.E. Coast and Sheffield)							
Lincs.	8	—	41.9	—	—	—	41.9
North-East Coast	16	1.8	57.6	—	—	—	59.4
Scotland	6	0.2	18.0	0.6	—	—	18.8
Staffs., Shrops., Worcs., and Warwicks.	5	—	7.5	0.9	—	—	8.4
S. Wales and Monmouthshire	11	2.4	61.4	—	—	—	63.8
Sheffield	2	—	3.7	—	—	—	3.7
North-West Coast	7	17.1	0.6	0.4	—	1.0	19.1
Total ..	78	22.9	228.3	23.3	0.7	2.1	277.3
October, 1959 ..	76	22.0	220.0	23.9	1.1	2.8	269.8
November, 1958..	85	23.7	190.0	17.6	0.2	2.2	233.7

[1] Weekly average of calendar month.

[2] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.

[3] Five weeks, all tables.

[4] Other than for conversion into any other form of finished steel listed.

[5] Includes finished steel produced in the UK from imported ingots and semi-finished steel.

[6] Material for conversion into other products also listed in this table.

House Organs

Demag News, No. 156. Published by Demag A.G. Duisburg, Germany.

This issue carries an article on the continuous casting of steel, which is of particular importance to the makers of ingot-moulds, and rolling-mill makers. This is because, with continuous casting, ingot-moulds are eliminated, in addition to heavy rolling mills. One plant described in the article has been installed in an Italian works, and this permits the simultaneous casting of eight strands of 4¾- and 5½-in. sq. bars, from a 60-ton melt, at the rate of 8 ft. per min. The bars are flame cut to a length of 10 ft. and the annual output is rated between 180,000 to 200,000 *tonnes*. Should the continuous casting of steel greatly expand then it will have a serious repercussion on the ingot-mould foundries.

Close-up No. 16. Issued by Armstrong Whitworth (Metal Industries), Limited, and Jarrow Metal Industries, Limited.

The old saying "better late than never," is exemplified in this issue by printing an interesting biography of Mr. C. W. Lashly, the firm's London-office manager, and then in a postscript stating that he retired at the end of 1958. Mr. Lashly was born "on the strength" and stayed in the army to serve in the 1914 war, retiring as a commissioned officer. He is well known for the magnificent work he did both in Newcastle and nationally for the Institute of British Foundrymen. The magazine, as usual, faithfully reports the major social activities of the firm.

Le Grand Magazine, Vol. 3, No. 3/4. Issued by Le Grand Sutcliff & Gell, Limited, Iddesleigh House, Caxton Street, London, S.W.1.

As the Le Grand Western Foundries, Limited, have recently been casting a string of rocking horses, this issue of the magazine contains a series of sketches showing the changes in design of these "steeds" throughout the ages. The latest design perpetrates the distended nostrils and fiery eye of the traditional horse, but the spotted version has been replaced by a more realistic-looking black animal with a white mane, tail and fetlocks. As usual the issue contains all the gossip of the personnel of the company.

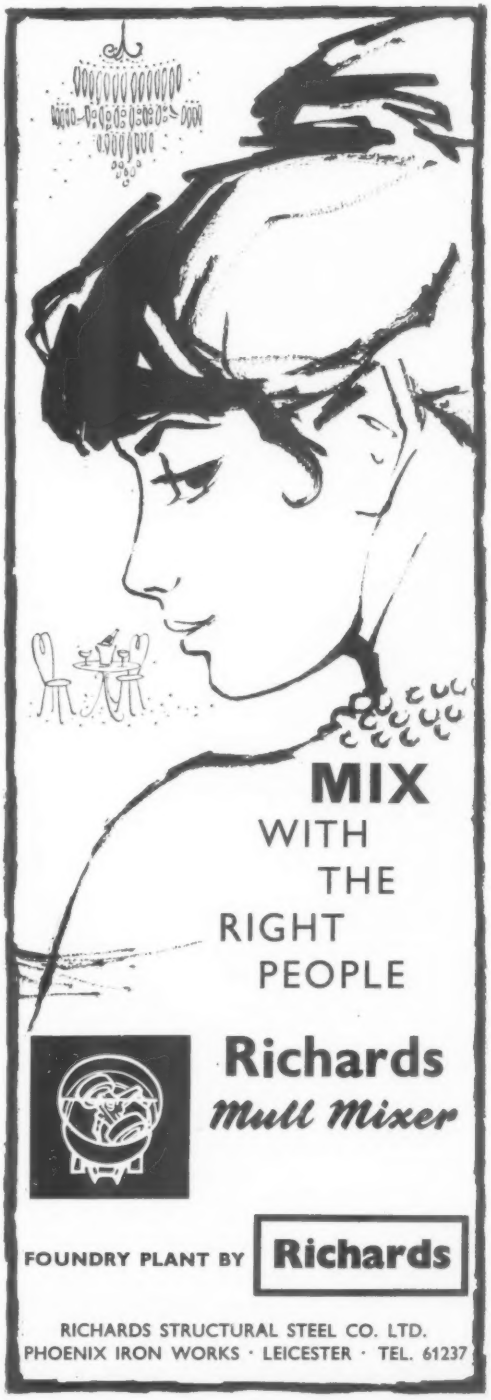
The Stantonian, Vol. 21, No. 10. Issued by Stanton Ironworks Company, Limited, near Nottingham.

This issue contains a full report of the annual prize-giving, the actual duty of presenting the prizes being in the hands of Mr. J. K. N. Davis, B.A., who is chairman of the training committee of the Council of Ironfoundry Associations. It is also reported that the Stanton apprentices have done well in the Duke of Edinburgh's award scheme. A special mention is made of the retirement, after 18 years, of the Editor of the Stantonian, Mr. S. Wood. He is being replaced by Mr. D. J. Drake and Mr. F. A. Gilkes.

Broomwade News Bulletin, Vol. 22, No. 6. Published by Broom & Wade, Limited, High Wycombe, Bucks.

This issue contains an account of a visit by the chairman, Mr. H. "Dick" Broom, to Canada and the USA. It also carries a group picture of a visit by foundrymen to the works on the occasion of the IBF National Works Visits Day.

THREE MEN received burns to the legs from molten metal at the Leicester foundry firm of S. Russell & Sons, Limited, last week.



Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

February 3, 1960

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over: N.-E. of England (local iron), £24 14s. 0d., Scotland (Scotch iron). Zone S.1, £25 0s. 6d.; Sheffield, £26 2s. 6d.; Birmingham, £26 9s. 0d.; Wales (Welsh iron), £24 14s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 10s. 0d. to £44 0s. 0d., scale 15s. 0d. per unit, lumpy; 75 per cent. Si, £57 0s. 0d. to £62 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 12s. 0d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 15s. 0d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £78 10s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £77 0s 0d. to £80 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8½d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 10¼d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £245 0s. 0d.; 96/98 per cent., £275 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £63 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 6 to 35 tons, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), under 10 tons, £34 17s. 0d.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting, under 10 tons, £36 14s. 6d. SIEMENS MARTIN ACID (under 10 tons): Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d

Billets, Blooms, and Slabs for Forging and for Stamping (under 10 tons).—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections (under 10 tons).—Ship plates, (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. 0d.

Alloy Steel Bars.—1 in. dia. and up; Nickel, £68 10s. 0d., nickel-chrome, £99 4s. 0d.; nickel chrome-molybdenum £111 17s. 0d., in lots of 5 tons to under 10 tons.

NON-FERROUS METALS

Copper.—Cash, £258 10s. 0d. to £259 10s. 0d.; three months, £244 10s. 0d. to £245 0s. 0d.; settlement, £259 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 6¾d. per lb.; rods, 278s. 6d. per cwt. basis; 20 s.w.g., 313s. 6d. per cwt.

Tin.—Cash, £792 0s. 0d. to £793 0s. 0d.; three months, £788 0s. 0d. to £788 10s. 0d.; settlement, £793 0s. 0d.

Lead (Refined Pig).—First half February, £73 12s. 6d. to £73 15s. 0d.; first half May, £73 12s. 6d. to £73 15s. 0d.

Zinc.—First half February, £90 0s. 0d. to £90 5s. 0d.; first half May, £89 10s. 0d. to £89 15s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £127 15s. 0d.; rolled zinc (boiler plates), all English destinations, £125 10s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £105 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 1¼d. per lb.; sheets to 10 w.g., 224s. 9d. per cwt.; wire, 2s. 10¾d.; rolled metal, 224s. 9d. per cwt.

Brass (Brazing).—BS1400, B3, £165; B6, £219.

Brass (High Tensile).—BS1400, HTB1, £200; HTB2, £215; HTB3, £228.

Gunmetal.—BS1400, LG2, £210; LG3, £219; G1, ¼%, £276; G1, 1%, £265.

Phosphor Bronze.—BS1400, PB1 (AID released), £308; BS1400, 90/10/1, £300.

Leaded Phosphor Bronze.—BS1400, LPB1, £226.

Phosphor Bronze Strip, etc.—Strip, 318s. 3d. per cwt.; wire, 4s. 4¼d. per lb.; rods, 3s. 7d.; tubes, 3s. 7d.; chill cast bars; solids 3s. 6¼d.; cored 3s. 7¼d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 4s. 1d. per lb.; round wire, 10g in coils (10 per cent.), 4s. 6d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 5d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 0d. to 2s. 3d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £71 10s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £256; AB2, £265.

* Average 68-70 per cent.

New Catalogues

Refractories. The receipt of a 24-page splendidly illustrated catalogue from the Stourbridge Refractories Company, Limited, Pensnett, Brierley Hill, Staffs, reminded the reviewer of the great changes that have taken place in the refractories industry during the last three or four decades. To-day, new manufacturing techniques have resulted in the provision of special shapes and standard sizes of greater dimensional accuracy and enhanced refractoriness compared with those of but a few years ago. The brochure sets out clearly how this approach to better quality production has been and is being obtained.

Electrically-heated Box-type Furnaces. A.E.I.-Birlec, Limited, Erdington, Birmingham, 24, in publication No. 501, detail two ranges of box-type furnaces, one operating at 1,000 and the other at 1,400 deg. C. These furnaces can be designated general purpose for they are used in tool rooms, heat-treatment departments, and in laboratories. The former range has five sizes starting at 2 ft. by 13 in. by 8 in. up to 5 ft. by 3 ft. by 1 ft. 9 in. high. The latter range includes four sizes, the largest being 30 by 15 by 12 in. The booklet carries full technical and shipping data.

Packings and Jointings. Turner Brothers Asbestos Company, Limited, P.O. Box No. 40, Rochdale, Lancs, have issued a loose-leaf catalogue (reference No. AA60) which runs to over 100 well-illustrated pages. It really exceeds the boundary of an ordinary catalogue, being a veritable text-book on the subject of packings and jointings. Purchasing officers will note that asbestos mill board is included, a material often used in foundries for applications such as the carrying of cores and the insulation of furnaces.

Welding Nimonic Heat-resisting Alloys for Gas-turbine Assemblies. This publication, providing the latest technical data and operating instructions for oxy-acetylene, argon-arc, metal-arc, and flash-butt welding of the Nimonic alloys for gas-turbine assemblies, has been released by Henry Wiggin & Company, Limited, Thames House, Millbank, London, S.W.1. Included are tables showing specified compositions, physical properties, recommended heat-treatments and appropriate welding materials (filler wires, fluxes and electrodes).

Timing Belt Drives. Publication No. 359, received from Crofts (Engineers), Limited, Bradford 3, deals with the PowerGrip timing belt drives for power transmission up to 64 h.p. at 6,000 r.p.m. Those of ½- and $\frac{2}{5}$-in. pitch drives are always stocked by the company, but the $\frac{7}{8}$- and 1¼-in. have to be ordered. There are many pages of tabular matter to aid the engineer in his selection of the most appropriate size.

Industrial Structures. J. E. Lesser & Sons, Limited, Green Lane, Hounslow, Middlesex, are, according to a four-page leaflet they have released, using a high-tensile steel in the manufacture of standard factory buildings. These structures they have called "Ten-span," covering a range of eight spans from 32 ft. to 96 ft. in 8-ft. increments. If desired they can be designed to carry a crane gantry for handling loads up to 10 tons.

Small Tools. A catalogue received from Thomas Chatwin & Company (a Brockhouse company), Victoria Works, Great Tindal Street, Birmingham 16, covers recently-developed items in a range of special tools, which includes milling cutters of various types and chasing tools. The brochure runs to 10 pages and is well illustrated.

PIG IRON, **All Grades**
METALLIC ABRASIVES
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FOUNDRY MACHINERY

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CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Fifteen words for 7/6 (minimum charge) and 4d. per word thereafter. Box Numbers 2/6 extra (including postage of replies). Situations wanted 2d. per word throughout.

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

MANAGER/FOREMAN, 41, wide practical experience ferrous and non-ferrous, jobbing mechanisation, seeks position. Box MF344, FOUNDRY TRADE JOURNAL.

EXPERIENCED REPRESENTATIVE in iron and steel with practical foundry background desires change. Clean licence. Box ER382, FOUNDRY TRADE JOURNAL.

REPRESENTATIVE with foundry experience wishes to represent a foundry for non-ferrous and cast iron in London and Counties. Good personal connection. Commission and part expenses. Box RW372, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE, Aluminium, sand and gravity die casting field, requires appointment with increased scope and prospects. Southern area preferred. Box TR374, FOUNDRY TRADE JOURNAL.

FOUNDRYMAN, 24, with a good all-round foundry training in cast iron jobbing (40 tons), holder of the National Foundry College Diploma, seeks position of responsibility, production or technical, with good prospects. Box FO375, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

METAL PATTERNMAKERS

FIRST CLASS experienced craftsmen required. High rates, bonus, modern conditions. UNIVERSAL PATTERN PRECISION ENGINEERING CO. LTD., Kelvin Way, Crawley, Sussex.

PRACTICAL FOUNDRY MANAGER required for Grey Iron Jobbing Foundry in North Manchester area. Weekly production 6 tons. State age and experience. Box PF369, FOUNDRY TRADE JOURNAL.

WANTED. Practical FOUNDRYMAN fully experienced in melting and casting techniques of all non-ferrous metals. South Wales Area. Box PF361, FOUNDRY TRADE JOURNAL.

ASSISTANT TO FOUNDRY MANAGER required for malleable and cast iron Foundry. A good all-round foundry training is required together with initiative, drive and personality. The successful applicant, who should be in the age range of 22 to 30 years, will be required to deal with specific problems under the guidance of the foundry manager. Pension scheme, and sports and social club facilities. Write giving full details of age, education and experience to THE GENERAL WORKS MANAGER, BAGSHAWE & CO. LTD., Dunstable Works, Dunstable.

CORE SHOP FOREMAN required by Repetition Foundry in the West Midlands. Must have had experience in the production of large quantities by modern machine methods. Experience in Shell and CO$_2$ processes would also be an advantage. Please state fully details of experience and salary required. Box CS320, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

STEWARTS AND LLOYDS, LIMITED require a
METHODS ENGINEER

TO take charge of the Methods Department at their TOLLCROSS STEEL FOUNDRY near GLASGOW.

Applicants should preferably have worked with both alloy and plain carbon steel castings, in the weight range up to 6 tons, but more important is a thorough practical knowledge of modern steel foundry methoding.

Written applications, giving full particulars of age, education and experience, should be sent to the MANAGER, Personnel Services, Clyde Tube Works, Coatbridge, Lanarkshire.

STEEL
FOUNDRY MANAGER

BROWN, LENOX & CO. LTD., require a MANAGER for their Steel Foundry at Pontypridd.

Applicants must be experienced in the manufacture of Carbon and Medium Alloy Steel Castings up to 3 tons in weight, and in all aspects of foundry management.

Age 40-45. Pension Scheme. House Available.

Apply with full particulars to the Managing Director,

BROWN, LENOX & CO. LTD.,
Pontypridd, Glamorgan.

FOUNDRY FOREMAN wanted for N.E. Coast. Experienced semi-mechanised production, CO$_2$, Cupola, Sand Control, piece working. Sound disciplinarian. Age 30/35. Reply, giving full particulars of experience, qualifications and salary required. Box FF365, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

FOUNDRY CHARGEHAND. Expanding aluminium foundry requires working Chargehand Moulder. Excellent opportunity for a man with initiative. Apply, giving details of age, experience, married or single, wages required, to: STARFRICO FOUNDRY, LIMITED, Oak Yard, Halstead, Essex.

ROUTINE ANALYST required for the analysis of cast iron, steel and non-ferrous metals. Knowledge of foundry materials preferred. Capable of working without supervision. Good salary, Pension Scheme, canteen.—Box RA363, FOUNDRY TRADE JOURNAL.

PATTERNMAKERS—Wood and Metal—required. Coventry area. High rates, bonus, ideal conditions. Box PW341, FOUNDRY TRADE JOURNAL.

ASSISTANT CHEMIST, aged 21-23, required for the Laboratory of an Aluminium Die Casting Shop situated on the South Coast. Please apply in writing, giving full details, to WELLWORTHY LTD., Ampress Works, Lymington, Hants.

MOULDERS skilled floor. Preferably experienced aluminium—good piecework—wanted by firm with heavy order book. Club and canteen facilities. Apply LIGHTALLOYS, LTD., St. Leonards Road, Willesden Junction. Elgar 7191.

S. WALES Aluminium Foundry require SAND FOUNDRY SUPERINTENDENT for Non-ferrous Aluminium work to cover Aircraft-type Castings, X-rayed in high grade alloys. Box SW368, FOUNDRY TRADE JOURNAL.

YOUNG, energetic, time-served FOUNDRYMAN, full of enthusiasm and ideas, required in the first case as Foundry Foreman, with the view to becoming Foundry Manager. Busy foundry in Southern Counties. Write giving details of past experience and salary required. Box YE384, FOUNDRY TRADE JOURNAL.

Foundry Manager

for Henry Wallwork & Co. Ltd., of Manchester, ironfounders specializing in high-quality grey-iron castings. Initial remuneration including profits participation, about £2,000 per annum, plus pension scheme and other benefits. Preferred age 35 to 50.

The Foundry Manager will be responsible to the Managing Director and will be in control of the foundry which is completely mechanised. He will also be responsible for providing technical information for estimates and quotations and for the development and application of technical foundry methods.

The appointment offers considerable scope and excellent prospects for an experienced executive with first-class technical background (must be an active member of the Institute of British Foundrymen), including sound knowledge of pattern-making, core-blowing and CO$_2$ core-making. Must also have extensive experience of mechanised foundry equipment, preferably acquired in a medium-sized organization, plus sound metallurgical knowledge, good appreciation of work study and about five years' experience at management level.

Please write briefly in first instance, quoting Reference No. 342, *to:—*

AA LTD

ASHLEY ASSOCIATES LTD
PETER HOUSE, MANCHESTER 1

RETAINED TO ADVISE ON THIS APPOINTMENT

The strictest confidence will be observed and no details of candidates will be passed to clients without candidates' permission.

SITUATIONS VACANT—*contd.*

PATTERN INSPECTOR. Previous experience on high class Wood and Metal Work essential. Modern factory conditions. High rates. UNIVERSAL PATTERN & PRECISION ENGINEERING CO., Kelvin Way, Crawley.

WORKS MANAGER required by Manchester Firm of Ingot Makers. Knowledge of Non-ferrous Ingot Manufacture and General Management essential. Pension Scheme and car. Write giving full details of qualifications and experience to BOX WM383, FOUNDRY TRADE JOURNAL.

SALES MANAGEMENT

AN industrial concern in South London is anxious to obtain the services of a potential SALES MANAGER. The ideal applicant would be between the ages of 30 and 35, have had previous sales experience—preferably of technical products in the foundry and allied trades—and be a leader.

The vacancy is occasioned by the impending promotion of the present Sales Manager and the ear-marking, for other senior positions, of suitable staff already in the organisation. If, therefore, you feel that you are prepared to accept a challenging position in a technical and competitive industry write to Box SM379, FOUNDRY TRADE JOURNAL, giving all the details you feel would compel the advertiser to interview you.

TRAINEE SALES ENGINEERS, well educated, with foundry experience, age group 24 to 35, required by Britain's largest manufacturers of foundry plant and machinery for technical sales. Must be prepared world travel, including permanent residence overseas if satisfactory. Suitable applicants will be selected for interview. Apply to Box 324, DORLAND ADVERTISING LTD., 28, Haymarket, S.W.1.

APPLICATIONS are invited from Foundrymen who feel they could successfully fill the position of FOUNDRY/WORKS MANAGER with an expanding, modern Blackheart Malleable Iron Foundry completely mechanized and operating the latest production techniques. Applicants should have a sound technical background, preferably with experience in Blackheart Malleable production. The position is superannuated and the salary would be commensurate with the qualifications of the successful applicant. Please reply by giving details of age, training and experience, and salary required to: GENERAL MANAGER, Gloucester Foundry Limited, Emlyn Works, Gloucester.

METALLURGIST

METALLURGIST required for large Iron Foundry in West of Scotland (Glasgow area).

Applicants should have good technical background and be capable of directing through metal and sand control. This position offers excellent prospects for a man of initiative. Staff conditions, excellent canteen and good travelling facilities. Apply Box MM326, FOUNDRY TRADE JOURNAL.

BRITISH Manufacturers of bonding materials for foundry sands are increasing their representation in the Midlands and invite applications from men of experience and integrity who seek a tough but rewarding career in selling. The successful applicants will be provided with car, must reside in the Midlands, and will be expected to join the Company's contributory pension scheme. Details of education, career to date and present salary, will be treated with strict confidence if sent to Box BM378, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

FOUNDRY QUALITY CONTROLLER required for light and heavy ferrous and non-ferrous foundry in Lancashire, to be responsible for control of cupolas and non-ferrous furnaces, sand, control, etc. Applicant should have commercial and metallurgical training. The position offers considerable scope to an energetic and capable man. Applications, stating age, experience, qualifications and salary required, to Box FO376, FOUNDRY TRADE JOURNAL.

NEWTON, CHAMBERS & COMPANY LIMITED

Thorncliffe, near Sheffield

wish to appoint

A FOUNDRY MANAGER

TO take complete charge of its heavy foundry which has a capacity of nine thousand tons per annum of castings ranging from a few ounces to twenty-five tons in weight and in alloys and special irons as well as standard foundry irons.

There is some mechanised production as well as floor moulding in drysand, greensand and loam and the foundry serves in particular the steel, chemical, gas and electrical industries.

An attractive starting salary will be offered to the successful applicant who must have the required technical background and experience and the right personality to control effectively a unit of the size and complexity described.

There is a contributory pension scheme and help with housing is available.

Applications, which will be treated in the strictest confidence, should be made on the Company's official application form, which may be obtained from the PERSONNEL OFFICER, NEWTON, CHAMBERS & Co., LTD., Thorncliffe, near Sheffield.

SALES REPRESENTATIVE required by progressive Foundry in North-East England. Expanding capacity for Iron and Non-ferrous Castings and Pattern-making. Box SR373, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required. Experienced practical man accustomed to handling labour and all aspects of jobbing and semi-mechanized production. Probable assistance with housing after probationary period. Situation N.W. London. Box FF370, FOUNDRY TRADE JOURNAL.

FOREMAN required for Hot Chamber Die Casting Department. Excellent conditions and prospects for first class man fully experienced in all aspects of managing this expanding and important department. Assistance will be given with removal and housing to successful applicant. Please write giving full details in strict confidence to THE GENERAL MANAGER, Spot-On Models, Ltd., Belfast, Northern Ireland.

EXPERIENCED ESTIMATOR required for Foundry and Pattern Shop work. Some knowledge of Machine Shop estimating would also be beneficial but not essential. Reply giving details of experience and qualifications. State salary required. H. C. HOPPER (NORWICH), LTD., "Norfolk Iron Works," Coslany Street, Norwich, Norfolk. NOR. 82K.

HAND MOULDER required for small Jobbing Foundry. Experience of Non-ferrous metals essential. Good wages and conditions. Apply to PERSONNEL DEPARTMENT, E.M.I. Ltd., Blyth Road, Hayes, Middlesex.

AGENTS

SALES AGENT offers services to Foundries. Grey iron and malleables. London area covered. Part expenses and commission. Box SA353, FOUNDRY TRADE JOURNAL.

AGENTS—*contd.*

AGENT based on Birmingham offers manufacturers an accommodation address with facilities for sales representation if desired. Connection exists with foundries, large industrial groups, builders and contractors and associated groups. Principals interested please write BOX AB377, FOUNDRY TRADE JOURNAL.

AGENCY

REPRESENTATIVES REQUIRED

LIVE AGENTS required in several industrial areas in United Kingdom, calling on Foundries, Boiler Houses, etc., to sell Refractories. Right men can earn over £2,500 per annum. Write to: CORROSION LIMITED, Malvern Road, Southampton.

BUSINESS FOR SALE

SMALL, OLD ESTABLISHED, well equipped Non-ferrous Foundry as going concern. Excellent order book. Centre motor and machine tool industry. Owner retiring. Central freehold property. Good access room for expansion. Investigation welcome. Box SO381, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED

WANTED. Cumming Hand Roll-over Moulding Machine. Price and details to ENGINEERING CASTINGS (WORCESTER) LIMITED, Newton Road, Worcester.

WANTED.—Annealing capacity for Whiteheart Malleable, section ¼ in. to 1 in. Gaseous or Can Annealed. Box WA385, FOUNDRY TRADE JOURNAL.

COMPRESSOR to deliver 50/100 cubic feet per minute at 100 lbs. per sq. inch. Midland area. Please state age, location, and price. Box CT386, FOUNDRY TRADE JOURNAL.

NEW or Second-hand Core Stove required, 8 ft. × 6 ft. × 7 ft. high approximately, with double doors on one side to accept rail mounted core control: stove to be gas or preferably oil fired. ROBERT CORT & SON, LTD., Reading Bridge Ironworks, Reading.

URGENTLY REQUIRED.—Two Coleman-Wallwork, Type WT.563 DBS Moulding Machines, in good condition. Box UR371, FOUNDRY TRADE JOURNAL.

MACHINERY FOR SALE

600

FANS

EIGHT—MATHEWS & YATES "Cyclone" paddle blade fans, size PB8, duty 2,000/8,000 c.f.m., 1 in./7 in. water gauge.

THREE—KEITH BLACKMAN high efficiency blowers, type 7, capacity 120 c.f.m., 18 in. water gauge.

STURTEVANT Monogram fan, size No. 6, 2,040/6,950 c.f.m., 2 in./ 5 in. water gauge.

GEORGE COHEN
SONS & CO., LTD.
WOOD LANE, LONDON, W.12
Tel: Shepherds Bush 2070
and STANNINGLEY nr. LEEDS
Tel: Pudsey 2241

MACHINERY FOR SALE—*contd.*

UNUSED "Martonair" Horizontal Pneumatic Cable Hoists, 300 lb. capacity, 100 lb. working pressure, 4-wheel articulated suspension trolley. Pendant control. £15 each. Box UM316, FOUNDRY TRADE JOURNAL.

FOUNDRY MELTING PLANT comprising 7-Ton per hour TITAN Cupola and 15-Cwt. PATERSON HUGHES Charger. Excellent condition. The area occupied by this plant is urgently required for re-development and, therefore, any reasonable offer will be considered. JOHNSON, RADLEY & SONS, LTD., Hillidge Road, Hunslet, LEEDS, 10. (Tel. No.: Leeds 75887-8.)

TWW

AIR COMPRESSORS

C.F.M.	Make	lbs. p.s.i.	Type	H.P.
300	Broomwade	100	EH.241	75
270	Broomwade	100	EH.240	55
210	C.P.T.	100	PB-4-210	50
200	Belliss & Morcom	100	—	49
200	Broomwade	100	D.23	45
100	Reavell	100	DSA6E	25

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Coleman Wallwork, jolt squeeze, roll-over, Moulding Machine.
Coleman R.2 Core Blower.
Roper Ladles, 3-cwts. to 15-cwts. capacity.
1,000 new Shanks, Tongs, etc., and small Ladles cheap.
1,000 pairs steel Moulding Boxes.
Six new Core Ovens. CHEAP.
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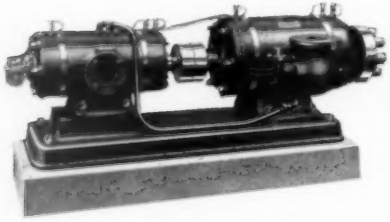

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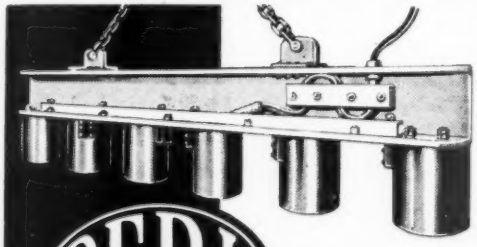

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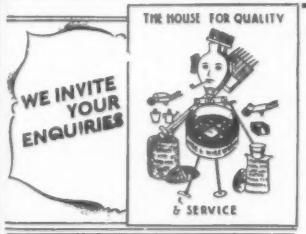

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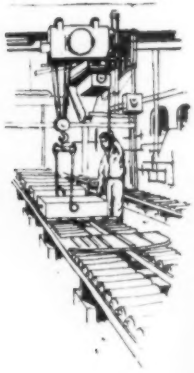
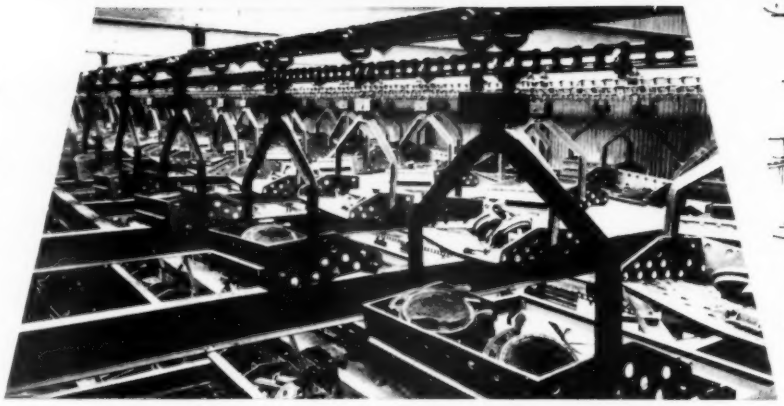
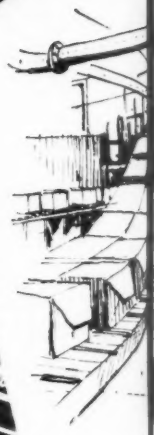
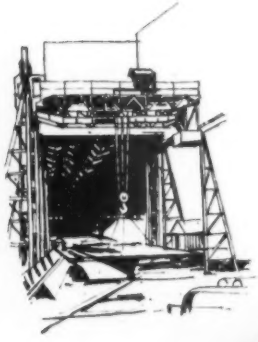






Part of a Paterson Hughes Cooling Conveyor which takes the castings clear of the floor and allows them to cool on the journey to the fettling shop.



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